



Acerca de este libro

Esta es una copia digital de un libro que, durante generaciones, se ha conservado en las estanterías de una biblioteca, hasta que Google ha decidido escanearlo como parte de un proyecto que pretende que sea posible descubrir en línea libros de todo el mundo.

Ha sobrevivido tantos años como para que los derechos de autor hayan expirado y el libro pase a ser de dominio público. El que un libro sea de dominio público significa que nunca ha estado protegido por derechos de autor, o bien que el período legal de estos derechos ya ha expirado. Es posible que una misma obra sea de dominio público en unos países y, sin embargo, no lo sea en otros. Los libros de dominio público son nuestras puertas hacia el pasado, suponen un patrimonio histórico, cultural y de conocimientos que, a menudo, resulta difícil de descubrir.

Todas las anotaciones, marcas y otras señales en los márgenes que estén presentes en el volumen original aparecerán también en este archivo como testimonio del largo viaje que el libro ha recorrido desde el editor hasta la biblioteca y, finalmente, hasta usted.

Normas de uso

Google se enorgullece de poder colaborar con distintas bibliotecas para digitalizar los materiales de dominio público a fin de hacerlos accesibles a todo el mundo. Los libros de dominio público son patrimonio de todos, nosotros somos sus humildes guardianes. No obstante, se trata de un trabajo caro. Por este motivo, y para poder ofrecer este recurso, hemos tomado medidas para evitar que se produzca un abuso por parte de terceros con fines comerciales, y hemos incluido restricciones técnicas sobre las solicitudes automatizadas.

Asimismo, le pedimos que:

- + *Haga un uso exclusivamente no comercial de estos archivos* Hemos diseñado la Búsqueda de libros de Google para el uso de particulares; como tal, le pedimos que utilice estos archivos con fines personales, y no comerciales.
- + *No envíe solicitudes automatizadas* Por favor, no envíe solicitudes automatizadas de ningún tipo al sistema de Google. Si está llevando a cabo una investigación sobre traducción automática, reconocimiento óptico de caracteres u otros campos para los que resulte útil disfrutar de acceso a una gran cantidad de texto, por favor, envíenos un mensaje. Fomentamos el uso de materiales de dominio público con estos propósitos y seguro que podremos ayudarle.
- + *Conserve la atribución* La filigrana de Google que verá en todos los archivos es fundamental para informar a los usuarios sobre este proyecto y ayudarles a encontrar materiales adicionales en la Búsqueda de libros de Google. Por favor, no la elimine.
- + *Manténgase siempre dentro de la legalidad* Sea cual sea el uso que haga de estos materiales, recuerde que es responsable de asegurarse de que todo lo que hace es legal. No dé por sentado que, por el hecho de que una obra se considere de dominio público para los usuarios de los Estados Unidos, lo será también para los usuarios de otros países. La legislación sobre derechos de autor varía de un país a otro, y no podemos facilitar información sobre si está permitido un uso específico de algún libro. Por favor, no suponga que la aparición de un libro en nuestro programa significa que se puede utilizar de igual manera en todo el mundo. La responsabilidad ante la infracción de los derechos de autor puede ser muy grave.

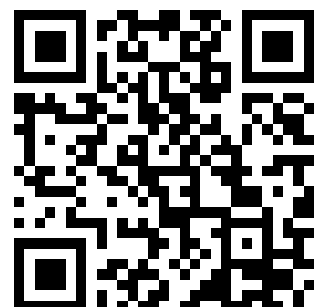
Acerca de la Búsqueda de libros de Google

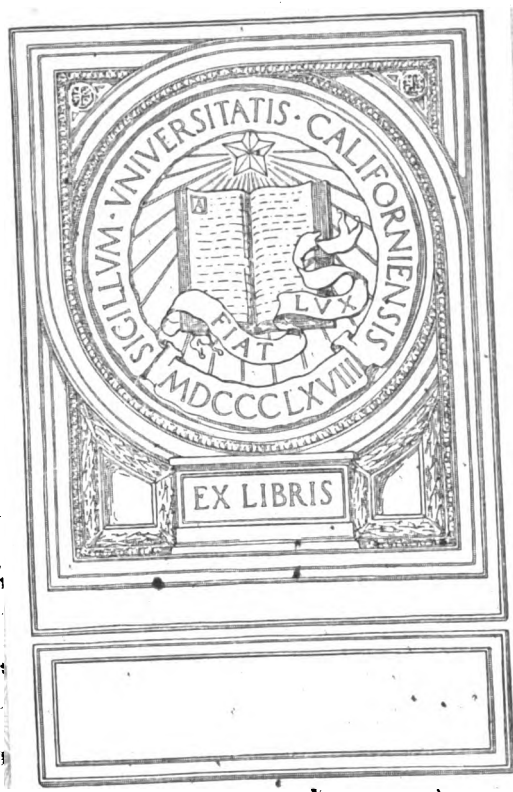
El objetivo de Google consiste en organizar información procedente de todo el mundo y hacerla accesible y útil de forma universal. El programa de Búsqueda de libros de Google ayuda a los lectores a descubrir los libros de todo el mundo a la vez que ayuda a autores y editores a llegar a nuevas audiencias. Podrá realizar búsquedas en el texto completo de este libro en la web, en la página <http://books.google.com>

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

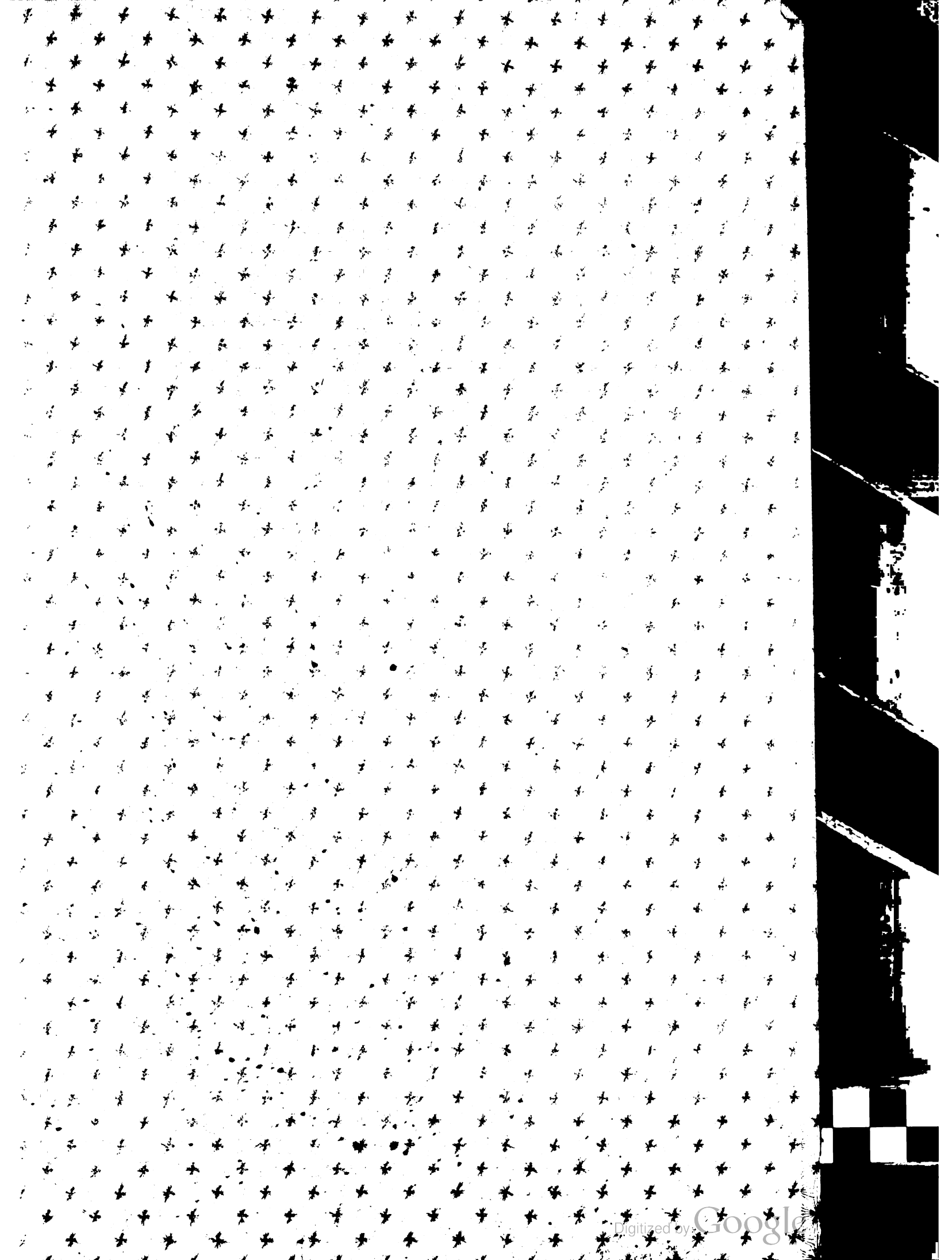
GoogleTM books

<https://books.google.com>





EX LIBRIS



THE AMERICAN TELEPHONE JOURNAL

Educate Your Employees.

A Short Editorial.

Recently the following letter came to *The American Telephone Journal*:

"Enclosed find check for \$11.00 for 11 yearly subscriptions to The American Telephone Journal for our employees, as per enclosed list.

*"BUFFUM TELEPHONE CO.,
"LOUISIANA, MO."*

The letter shows strikingly the valuation placed on this paper as an educator, by telephone officials. That they realize this, is one of the many reasons why it has by far the largest paid circulation of any paper in the field.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—JANUARY 2, 1904—CHICAGO Number 1 (w)

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

THE LINE IS BUSY.....By Leland Hume.
AN AMERICAN ENGINEER'S OBSERVATIONS IN EUROPE.....By T. Lidberg.
THE ADVENT OF WIRELESS TELEPHONY. HOW TO MAKE KNOTS AND SPLICES.
EARLY TELEPHONY ALUMINUM'S NEW APPLICATION.
TRACTION COMPANIES HAVE SUPERIOR RIGHTS TO TELEPHONE COMPANIES IN INDIANA.

The Operating Field:

W. W. DEAN AND A. E. BARKER ORGANIZE A NEW TELEPHONE MANUFACTURING COMPANY.
ENGLISH JOURNALISTIC FEAT. THE FEDERAL COMPANY'S AFFAIRS. INSPECTOR'S TESTING APPARATUS.
SERMON BY TELEPHONE. THE CUMBERLAND OUSTED FROM EVANSVILLE, IND.
TO THE ST. LOUIS FAIR EXHIBIT. TELEPHONES ON TROLLEY CAR.
TELEPHONE COMPANY REWARDS FIREMEN.
THE TELEPHONE IN THE COURTS.

QUERIES. THE EDITOR'S PAGE. PATENTS.
THE WEEK'S MESSAGES. TRADE NOTES.
WANT AND FOR SALE ADVERTISEMENTS, PAGE 16.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

*A Happy
New Year
To All*



International Telephone Mfg. Co.

CHICAGO, ILL.

What a rustling rustle this "turning over of a new leaf" would make if carried to actual practice, yet this week we have all said that we would do better this year. The desire is to do better.

On the battery proposition we all want to do better this year. Last year was the most successful "1900" dry battery year, and we know that the same method of maintaining the highest standard, together with the most approved and up to date machinery, and the policy of a "uniform product or none," will make even a better year than last, not only for us, but the great battery-using public.

We carry a large stock of "1900" dry batteries in Chicago, are marking immediate shipments and are quoting attractive prices.

ELECTRIC APPLIANCE COMPANY, CHICAGO

FARR

Telephone Construction and Supply Company

118-120 West Jackson Boulevard, CHICAGO

GUARANTEED GOODS

We Furnish Everything for Telephone Exchanges

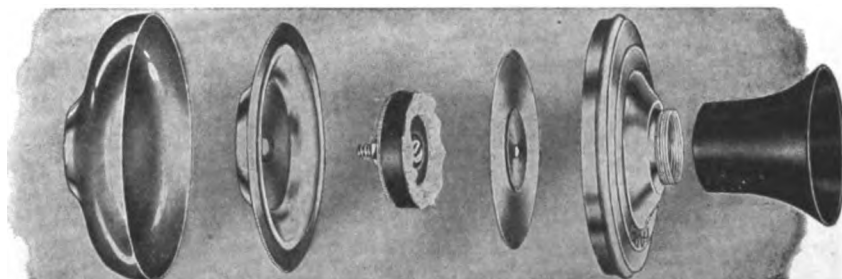
We Manufacture all our Goods for the Trade. We make 14 Different Styles of Telephones. Everything Sold Separate if Desired Full Line of Telephone Supplies. All Kinds Line Material and Tools.—Wire Brackets. Pins, Glass Insulators, Pole Steps, Braces. Send for our Catalogue of Instructions. A set of Ledgers and Blanks for Bookkeeping sent with a Telephone Order.

A CARD

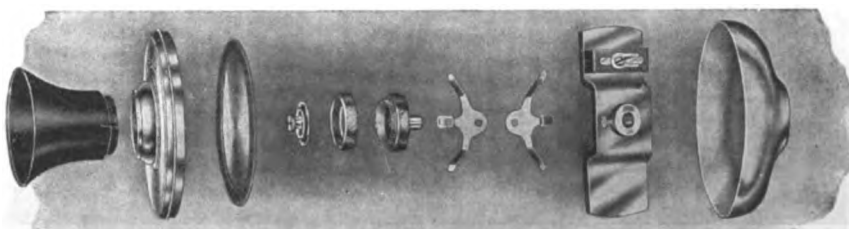
WE OWE OUR SUCCESS TO CLEAR TONE TRANSMITTERS, PERFECT RECEIVERS, STRONG MAGNETO BELLS, AND FAIR DEALINGS. TRY US WITH ONE ORDER. ♣ ♣ ♣ ♣ ♣



DESK SET No. 10.



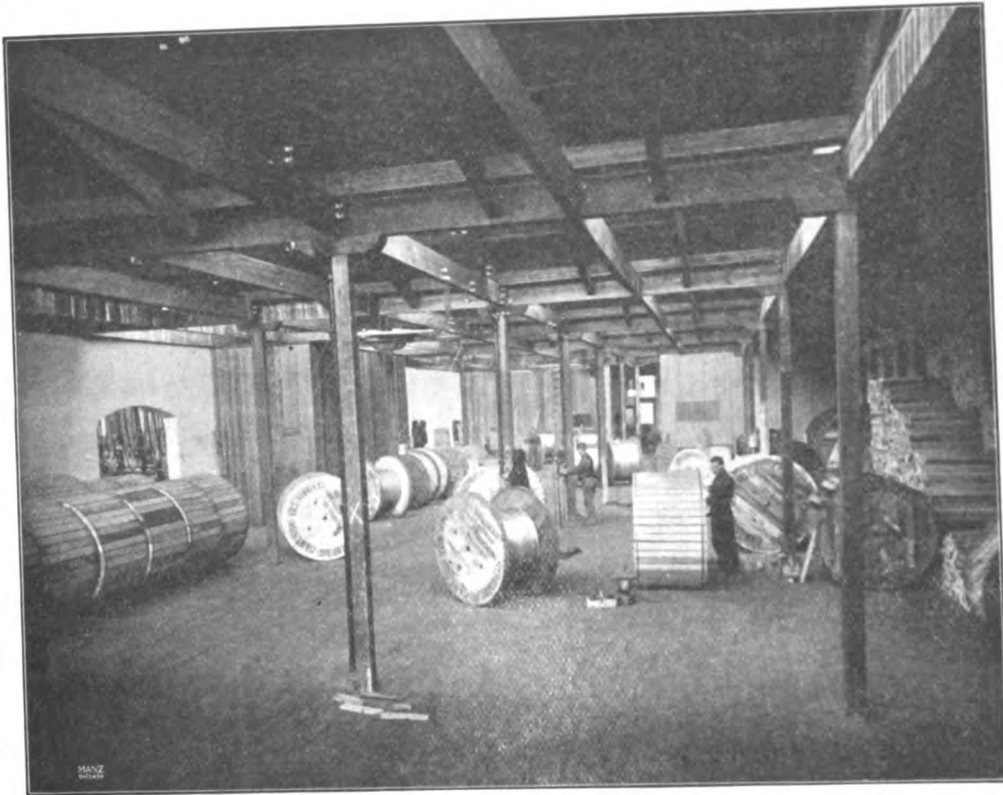
FARR CARBON TRANSMITTER No. 3.



FARR SOLID BACK TRANSMITTER No. 4.

WE ARE NOT CRYING WE DID IT!

but it is a fact just the same that you buy lead covered cable to-day for about 33 1/3% less than you could before we entered the field, and generally speaking materials and labor are higher.



LAGGING AND WEIGHING CABLE.

We do not expect to receive your business, however, on that account unless we make the price right. We are getting a good deal of this class of business, so we must be making the price right.

Prompt shipments on standard products.

We can make cable to meet any specifications.

Satisfaction guaranteed.

STROMBERG-CARLSON TEL. MFG. CO.

General & Eastern Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.

"DROPPED FROM ABOVE"

BEARING THIS DESIGN



THE PENDENT TELEPHONE

*IS NEVER OUT OF REACH
BUT NEVER IN THE WAY*

Suspended from ceiling battery by a faultless adjustable hanger it can be moved without effort down, up or in any direction. The mere act of lowering it for use signals Central.

WRITE FOR DESCRIPTIVE MATTER

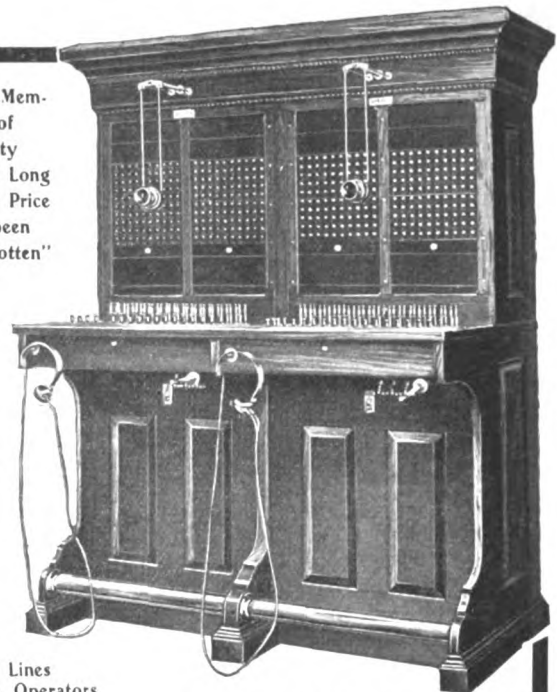
The Vought-Berger Company

Telephones, Switchboards and Appliances

LACROSSE, WISCONSIN

"The Memory of Quality Lasts Long After Price has been Forgotten"

C N
151



400 Lines
Two Operators

**REDUCE OPERATING FORCE
and PAY DIVIDENDS**

No. 12 Telephone for Interior Systems

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

*Send us a
trial order*

Don't fail to send for bulletin 6, describing No. 12 Telephone.

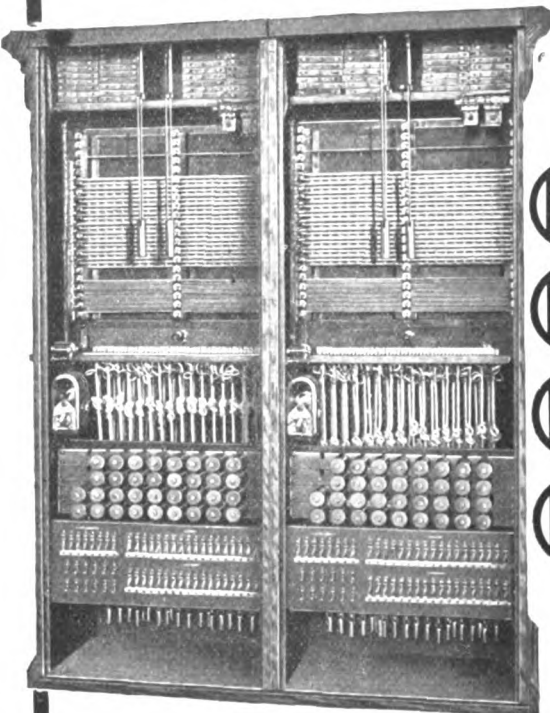
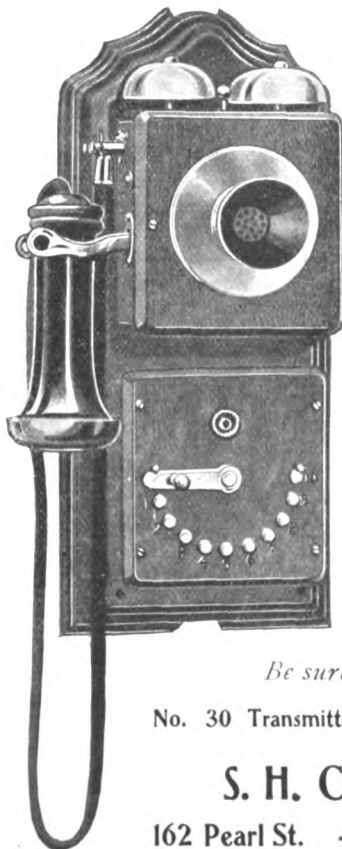
We make a lot of good things.

Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

S. H. COUCH CO.

162 Pearl St. - BOSTON, MASS.



EASY ACCESSIBILITY

**We Make All Kinds of
Switchboards,
Telephones,
Power Plants.**

THE NORTH ELECTRIC CO.

156-166 St. Clair Street, - CLEVELAND, O., U.S.A.



NEW



A LAMP SIGNAL BOARD FOR MAGNETO WORK

Signals Automatically restored, Lamp Supervision upon the Cords, Simple in Construction--A revelation in Switchboards for magneto exchanges. Write for price and description.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



TELEPHONE SUPPLIES



Our newest Bulletin, No. 233, showing Telephone and other Specialties, will be ready next week. Sent prepaid on request. This Bulletin will become a part of our big illustrated catalog.

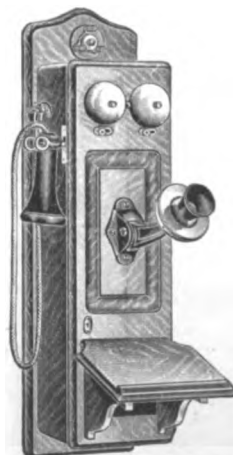
THE F. BISSELL COMPANY.
TOLEDO, O.

10 YEARS

EXPERIENCE IN THE MANUFACTURE OF

Telephone Apparatus!

SHOULD WE NOT KNOW HOW?



Complete Equipment for
Village Exchanges,
Country Party Lines,
Toll Lines,
Central-Energy Phones,
Private Plants,
Intercommunicating Phones.

New Catalog No. 7J sent on request. New prices.

No Better Transmitter can
be made than the new

"CONN" SOLID BACK

Send for sample on trial.

We have moved into our new factory, which is the largest and finest equipped telephone plant in the East.

Connecticut Telo. & Elec. Co.
MERIDEN, CONN.

RECENT New Apparatus of other manufacturers is conforming more and more to **KELLOGG STANDARD.**

Some manufacturers are entirely remodelling their telephone apparatus into what careful examination shows to be mere imitation of the **KELLOGG STANDARD APPARATUS.**

We are constantly improving and adding attractive features to our standard, but **FUNDAMENTAL CHANGES** in apparatus are only for those manufacturers whose product differs from Kellogg forms and Kellogg successes.

Examine for yourself!



KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Green and Congress Streets, Chicago

346 BROADWAY,	...	...	...	NEW YORK.
ELECTRIC BUILDING,	...	...	...	CLEVELAND.
KEYSTONE TELEPHONE BUILDING,				PHILADELPHIA.

The Monarch Desk Stand

IS UNDOUBTEDLY THE MOST SIMPLE
DESK INSTRUMENT YET PRODUCED.



The hook switch is mounted in the base, and is absolutely reliable in operation. All contacts are placed in plain sight by the removal of the sheet iron bottom.

A Monarch Transmitter and Receiver

insure a good talking circuit for either Central Energy or Local Battery systems.

For full description of this new stand and all other Monarch apparatus, see our new Catalogue, which will be sent upon application.

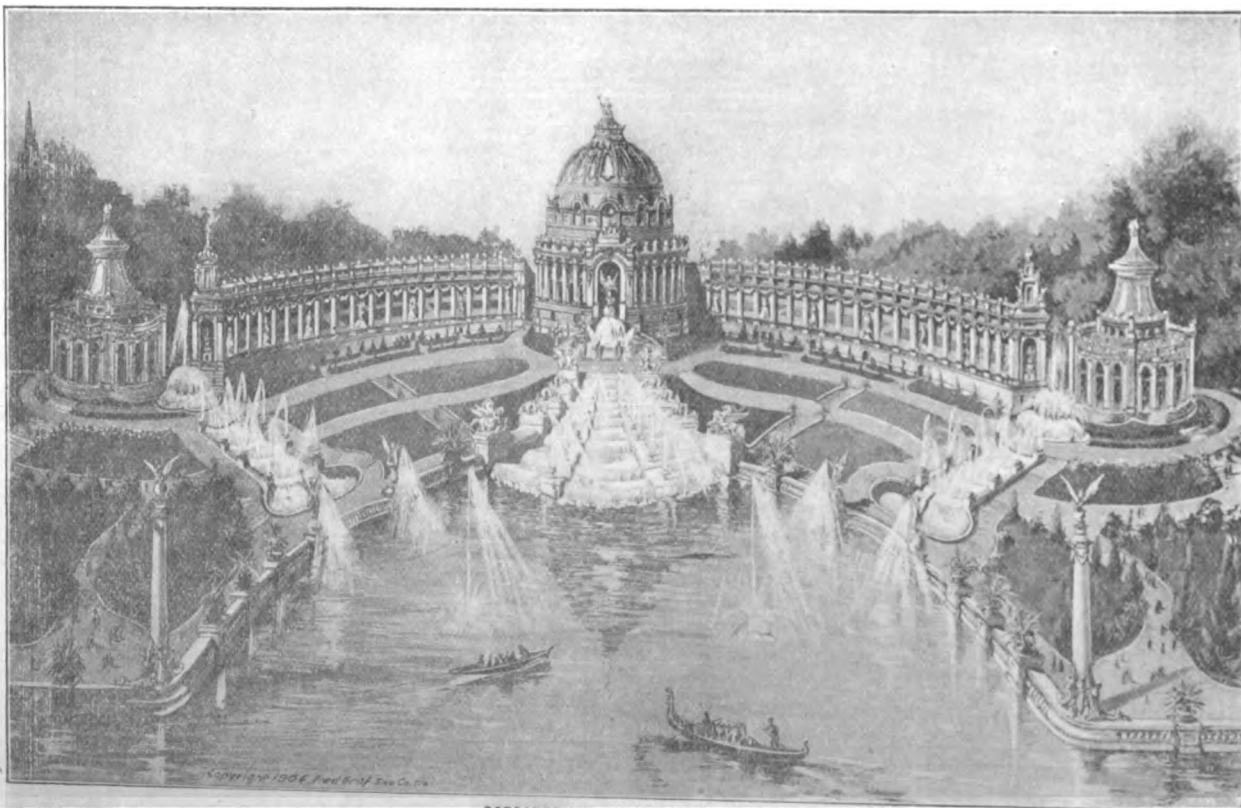
MONARCH TELEPHONE MFG. CO.,

14 South Clinton Street,

CHICAGO, ILLINOIS

World's Fair Art Catalogue No. 18 Now Ready Mailed free on request

TELEPHONE INSTRUMENTS



TELEPHONE SUPPLIES

CENTRAL TELEPHONE & ELECTRIC CO.

Manufacturers of High Grade Telephone Apparatus
Dealers in Everything Used with Telephones

909 MARKET STREET, ST. LOUIS, U. S. A.

“READY” TELEPHONE MEMORANDUM PAD HOLDERS



Style No. 1

Patent Pending

Can be furnished to fasten on telephone or on the wall as shown in illustration. Adjustable to any angle, each Holder has straight edge for tearing off memorandums.

NET PRICE EACH \$1.00

MANUFACTURED BY

THE W. G. NAGEL ELECTRIC CO., Toledo, O.

ADVERTISERS' DIRECTORY

American Conduit Co..... 41	Dickey Clay Mfg. Co., W. S. 40	Kellogg Switchboard & Supply Co., 7, 34	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan. 39
American Electric Telegraph Co..... 44	Eccleston Lumber Co..... 35	Klein, Mathias & Sons..... 35	Roebling's, John A., Sons Co..... 30
Am. School of Correspondence..... 10	Electric Appliance Co..... 3	Leslie, A. C. & Co..... 14	Scoville Mfg. Co..... 37
American Vitrifed Conduit Co..... 43	Fahnestock Transmitter Co..... 35	Lindsley Brothers Co..... 32	Standard Underground Cable Co. 14
Automatic Electric Co..... 9	Farr Telephone & Construction Supply Co..... 3	McIntire, C. Co..... 40	Stanton, L. W..... 36
Barr, W. J., Mfg. Co..... 14	Field, C. J..... 40	Maltoy Lumber Co..... 31	Sterling, W. C. & Son..... 36
Beidler, Francis & Co..... 35	Fowler, John H..... 34	Michigan Cedar Co..... 35	Sterling Electric Co..... 35
Bissell Co., The F..... 6	Franklin Mfg. Co..... 36	Middleton, J. W. & Co..... 35	Stromberg-Carlson Telephone Mfg. Co..... 4
Butterfield, J. F..... 36	Franklin Rolling Mill & Fdy. Co. 33	Miller Anchor Co..... 14	Swedish-American Tel. Co..... 12, 13
Camp, The H. B. Co..... 43	Gest, G. M..... 42	Monarch Telephone Mfg. Co..... 8	Telephone Printing Co..... 35
Central Mfg. Co..... 8	Hart & Co..... 11	Morse Cedar Co..... 35	Tengwall File & Ledger Co..... 10
Central Telephone & Electric Co. 8	Hemmings Glass Co..... —	Nagel, W. G., Electric Co..... 9	Townsend Cedar & Supply Co..... 34
Chicago & Alton Ry. Co..... 38	Holtzer-Cabot Electric Co..... —	National Wire Corporation..... 39	Valentine Clark Co..... 32
Chicago, Milwaukee & St. Paul Ry. 38	Huebel, C. J. & Co..... 31	New Haven Novelty Machine Co. 2	Vought-Berger Co..... 5
Chicago & Northwestern Ry. Co. 38	Imperial Finance & Cons Co..... 36	North Electric Co..... 5	Wanted, Situations, etc..... 16
Chicago Writing Machine Co..... —	Ingram-Richardson Mfg. Co..... 14	Okonite Company..... 36	Western Lumber & Pole Co..... 32
Cohn & Bock..... 35	Index of the Technical Press..... 32	Pacific Coast Pole Co..... 32	Weston Electrical Instrument Co. 36
Connecticut Teleph. & Electric Co. 6	International Telephone Mfg. Co. 2	Pignolet, L. M..... 37	Wisconsin Timber & Land Co..... 35
Cook, Frank B..... —	National Wire Corporation, New Haven, Conn. 40	Pittsburg & Lake Superior Iron Co. 31	Worcester, C. H., Co..... 31
Couch, S. H. Co..... 5	Okonite Co., New York..... 40		Yesbera Mfg. Co..... 14
Craghead Engineering Co..... 14	Roebling's Sons Co., John A., Trenton, N. J. 40		
Crossmire & Ackor..... 36	Standard Underground Cable Co., Pittsburg, Pa. 40		
Crumb, W. H. Co..... 36	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. 40		
Cunningham Iron Co..... 40			
BATTERIES.	CABLE HANGERS.	CONDUITS.	CONNECTORS.
Electric Appliance Co., Chicago, Ill. 40	Bissell Co., The F., Toledo, O. Cook, Frank B., Chicago, Ill. Craghead Engineering Co., Cin- cinnati, O. Nagel, W. G., Electric Co., To- ledo, O. Standard Underground Cable Co., Pittsburg, Pa. 40	American Conduit Co., Chicago, Ill. 40	Cook, Frank B., Chicago, Ill. McIntire Co., C., Newark, N. J. Nagel, W. G., Electric Co., To- ledo, O.
BONDS.	CABLE SLEEVES.		CONSTRUCTION SUPPLIES.
J. W. Middleton & Co., Chicago, Ill. 40	Nagel, W. G., Electric Co., To- ledo, O.		American Electric Tel. Co., Chi- cago, Ill. Barr, W. J., Mfg. Co., Cleveland, Ohio. Craghead Engineering Co., Cin- cinnati, O. Electric Appliance Co., Chicago, Ill. Farr Tel. & Const. Supply Co., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill.
BRASS.			
Scovill Mfg. Co., Chicago, Ill.			
BOOKKEEPING.			
Tengwall File & Ledger Co., Chi- cago, Ill.			
BOOTHES.			
Yesbera Mfg. Co., Toledo, O.			
CABLES.			
American Electric Tel. Co., Chi- cago, Ill. Bissell Co., The F., Toledo, O. Kellogg Switchboard & Supply Co., Chicago, Ill. Nagel, W. G., Electric Co., To- ledo, O.			

WANT AND FOR SALE ADVERTISEMENTS. PAGE 16.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



**If you don't give your subscribers
AUTOMATIC TELEPHONE SERVICE you
don't give them the best.**

Write for our catalogue.

Automatic Electric Company, Chicago, U. S. A.



Loose Leaf Devices

Tell us your needs and we will be pleased to make an estimate for you.

We can tell you all about loose leaf catalogues. Write now.

TENGWALL FILE & LEDGER CO.
CHICAGO-NEW YORK-SAN FRANCISCO

A
256
Page
Book on
Electricity

70
CENTS
by
Express
(Prepaid)

Page 7 x 10 in.
Bound in green buckram.
Over 100 illustrations.

MANY people believe Electricity cannot be taught outside the class room.

To demonstrate the standard, scope and methods of our instruction we have bound up four representative text books in our Electrical Engineering course in a handsome linen cover under the title of

PRACTICAL LESSONS IN ELECTRICITY

and will send one copy for **seventy cents** (the cost of binding and express charges) to every reader of The American Telephone Journal sending us the names of two friends interested in Electrical Engineering. (Address Room 9G).

The book is easily worth \$3.00 and we make this liberal offer because we know that an inspection of our text books will be convincing evidence of the practical value of our instruction.

The subjects embraced are:

STORAGE BATTERIES (prepared especially for home study by Prof. F. B. Crocker, Columbia University): Types; General Principles; Chemical Action; Data Sheets; Edison Storage Battery; Management; Electrolyte; Cadmium Test; Charging; Efficiency; Troubles and Remedies; Testing; Portable Batteries for Automobiles and Boats; etc.

ELECTRIC WIRING (prepared by H. C. Cushing, Jr., author of "Standard Wiring"): Dynamo Installation; The Switch Board; Lightning Arresters; Motor Installation; Tables; Transformers; Three-Wire System; Poles and Pole Setting; Inside Wiring; Arc Light Wiring; Conduit Work; Fixture Wiring; Cut-outs; Switches; Distribution of Light; Arc and Incandescent Systems; Fuses; Inspection; etc.

ELECTRIC CURRENT (by L. K. Sager, S. B.): Volt, Ampere; Ohm; Resistance, Conductivity; Tables; Circuits, Grouping of Cells; Quantity; Energy; Power; Coulomb; Joule; Watt; etc.

ELEMENTS OF ELECTRICITY (by L. K. Sager, S. B.): Magnets, Experiments with Magnets; Magnetizing Steel; Conductors and Insulation; Electric Machine; Leyden Jar; Voltaic Cell; Types of Cells; Electro-magnets; Induction Coil; Electrolysis; Electrotyping and Electro-Plating; The Telephone; The Telegraph; Sounder, Alphabet, Key, Battery, Relay, etc.

Illustrated 200 page quarterly Bulletin, giving full outlines of the following courses will be sent free on request.

Electrical Engineering,	Civil Engineering.
Central Station Work,	Structural Engineer's.
Wiring,	Municipal Engineer's.
Electrical Railways,	Railroad Engineer's.
Mechanical Engineering	Hydraulics.
Shop Practice	Architecture.
Tool Makers' Course.	Architectural Draw'g's.
Stationary Engineering.	Structural Design.
Firemen's Course (For License)	Carpenters' Course.
Engineers' Course (For License)	Contractors' Course.
Marine Engineering.	Mechanical Draw'g's.
Locomotive Engineering.	Perspective Draw'g's.
Sheet Metal P't'n Draft'g's.	Pen & Ink Render'g's.
Cotton Man'g. Course,	Mathematics.
Knitting Course,	Navigation.
Textile Design,	Telephony.
Woolen & Worsted Goods.	Telegraphy.
Woolen & Worsted Finish'g.	Tinsmithing.
Heating, Ventilation & Refrigeration.	Chemistry & Dyeing.
Plumbing,	College Preparatory Courses.
Surveying,	

American School of Correspondence

at

Armour Institute of Technology

CHICAGO, ILL.

Mention American Telephone Journal.

ADVERTISERS' DIRECTORY—Continued.

Klein & Sons, Mathias, Chicago, ILL.

Leslie, A. C., & Co., Montreal, Can.

Nagel, W. G., Electric Co., Toledo, O.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O. Electric Appliance Co., Chicago, Ill.

Farr Tel. & Const. Supply Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Klein & Sons, Mathias, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O. Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scoville Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Central Mfg. Co., Chattanooga, Tenn.

Cohn & Bock, Princess Anne, Md. Creaghead Engineering Co., Cincinnati, O.

Nagel, W. G., Electric Co., Toledo, O.

Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.

Crumb, W. H., & Co., Chicago, Ill.

Imperial Finance & Construction Co., Chicago, Ill.

Stanton, L. W., Cleveland, O.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 34.

FILES.

Tengwall File & Ledger Co., Chicago, Ill.

FUSES.

Cook, Frank B., Chicago, Ill.

Hart & Co., Chicago, Ill.

Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scoville Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.

Miller Anchor Co., Norwalk, O.

Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.

Nagel, W. G., Electric Co., Toledo, O.

Okonite Co., New York.

Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Hemingray Glass Co., Covington, Ky.

Nagel, W. G., Electric Co., Toledo, O.

Townsend Cedar & Supply Co., Chicago, Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Farr Tel. & Const. Supply Co., Chicago, Ill.

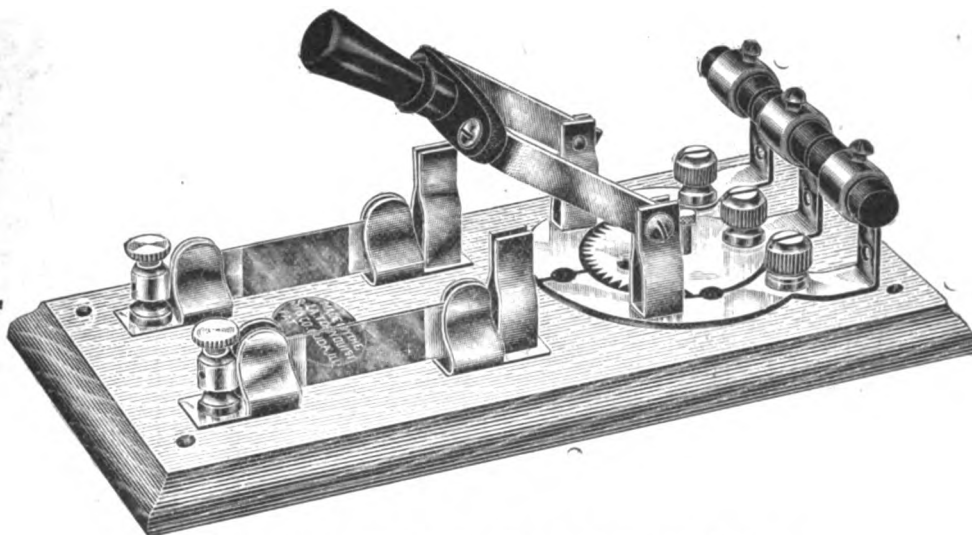
Kellogg Switchboard & Supply Co., Chicago, Ill.

Klein, Mathias & Sons, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.



"TORNQUIST"

Combination Lightning Arrester

GROUND SWITCH FUSE
AND LEVER CUT-OUT

KING OF PROTECTORS

The Best and Safest Protector
on the Market

Instantaneously Disconnected from Line

without interfering with other
instruments on same circuit.

THREE PROTECTORS IN ONE

The only Device of its kind on the market.

HART & CO.

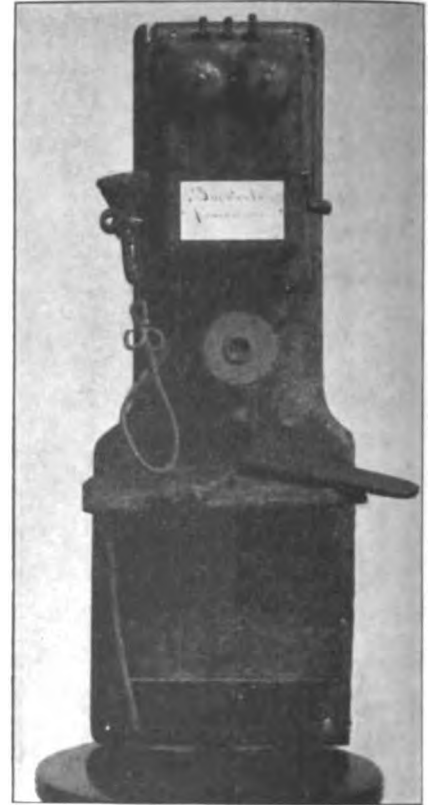
MONADNOCK
BLDG.
CHICAGO

Popular Prices

ORDER SAMPLE NOW

HART & CO.

MONADNOCK
BLDG.
CHICAGO



OFFICE OF

Lebanon Telephone Company

CASTLE HALL BUILDING

LEBANON, INDIANA. Dec. 4, 1903.

Swedish American Telephone Co.,
Chicago, Ills.

Gentlemen:-

It gives me great pleasure to begin business with your Company by handing you an order calling for a few of the Best and most Durable Telephones that are manufactured.

Of this fact I am assured because of an incident which came under my observation a short time ago, particulars of which I mail to you under separate cover.

Congratulating you on being the builders of the Best Telephones on the Market to-day and hoping that our future business relations will be the most pleasant, I beg to remain

Yours respectfully

Floyd Jones
M'yer

**Swedish-American
Tel. Co.**

CHICAGO

MAKERS OF

**Superior Telephone
Apparatus**



**Swedish-American
Tel. Co.**

CHICAGO

MAKERS OF

**Superior Telephone
Apparatus**

OFFICE OF

Lebanon Telephone Company

CASTLE HALL BUILDING

LEBANON, INDIANA, Dec. 5, 1903

Swedish American Telephone Co.,
Chicago, Ills.

Gentlemen:-

You will receive under separate cover Photographs. One view showing a very badly burned telephone, the other showing the ruins of the factory wherein it was burned.

The location of the instrument is shown by the x near the center of the debris, where the fire was the hottest and the damage the greatest.

The telephone was taken from the ruins on the morning after the fire and brought to the exchange as material for the Junk dealer. But while looking at it I had a desire to know if it would work.

After putting on a new receiver cord, the old one being entirely burned off, I called central and was greatly surprised by receiving a prompt reply.

Not altogether satisfied with this test I called up Indianapolis over long distance and talked to the manager of the New Telephone Co. of that City, who complimented me on the excellent talking qualities of my instrument.

I will say that in my six years of experience, in the Telephone business I have never before seen an instrument of such durability and superior construction, as your Swedish American, which withstood two hours of heat, smoke, and water and is still in fine working order.

The heat being so intense that it melted the mouth-piece entirely off and most of the receiver, as shown in the photo.

Believing this will be of great interest to you,
I beg to remain

Yours respectfully

Floyd Jones
mjr



BOOTH SENSE

Is Common Sense. Booths will treble your toll business. They'll double pay station receipts. But they've got to be right—**SOUND** proof and lasting. We make 'em that way.

YESBERA MFG. CO.,

**THE WORLD'S LEADERS IN TELEPHONE BOOTHS
TOLEDO, OHIO.**

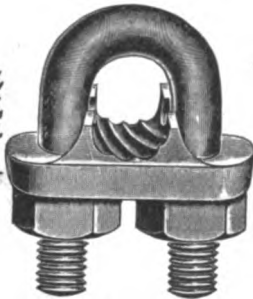
Write for Beautiful Catalogue and Prices.

Line Hardware

POLE FITTINGS

**CROSS ARMS, BRACES, BOLTS,
LAGS, WASHERS, PINS, STEPS,
MESSENGER HANGERS, GUY RODS,
and All Kinds of Telephone Line Con-
struction Material.**

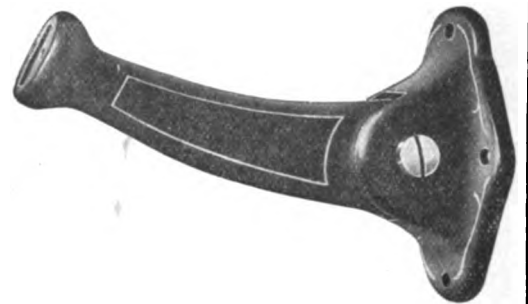
SEND SPECIFICATIONS



**The Creaghead Engineering Co.,
CINCINNATI, OHIO.**

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



All the big Companies
use them!

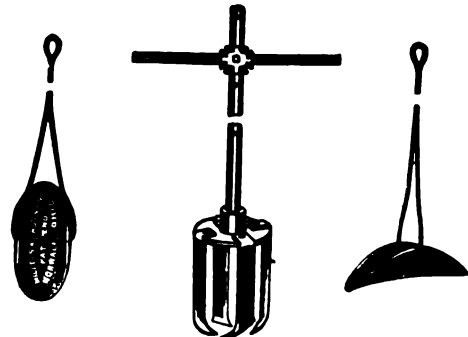
ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.



"THEY NEVER PULL UP"



Write for Description and Prices.
THE MILLER ANCHOR CO., Norwalk, Ohio

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND

A.C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insu-
lated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1903 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JANUARY 2, 1904

NUMBER 1

THE ADVENT OF WIRELESS TELEPHONY

A FEW years ago a young German professor discovered that the spark of a Rumkorff coil initiated in the luminiferous ether a wave which, like similar waves of sound and light, radiated from the exciting source and could be detected by suitable apparatus at a considerable distance from the source which produced it. This discovery by Professor Hertz laid the foundation of what is one of the most marvelous of scientific applications, the ability to transmit intelligence from point to point with no other means of communication than that all-pervading, almost incomprehensible entity in which the entire universe is immersed, the so-called luminiferous ether. For half a dozen years wireless telegraphy has been more or less of an accomplished fact. Inventors have vied with each other in producing systems more and more improved, and the radius of communications has gradually become extended from that of a few yards until now the possibility of signalling from America to Europe is regarded as an established fact.

The triumphs of wireless telegraphy have been rapid, but so far little has been heard, even as to efforts to produce an apparatus which should enable telephone messages to be transmitted without the use of conductors. An occasional rumor has arisen as to inventors who were studying this problem, but these have died away, leaving nothing but their recollection. Now, however, something somewhat more definite comes. Our esteemed contemporary, *The Commercial Advertiser*, recently reports some experiments with an apparatus for telephoning without wires that seems to be decidedly beyond anything which has previously been exhibited. According to the reports referred to, Professor

Collins has invented a method of talking without conductors, and a short time ago the apparatus was said to have been placed for the purpose of experiment and test upon two battleships, the *Kearsarge* and the *Alabama*, while at their docks some 1,500

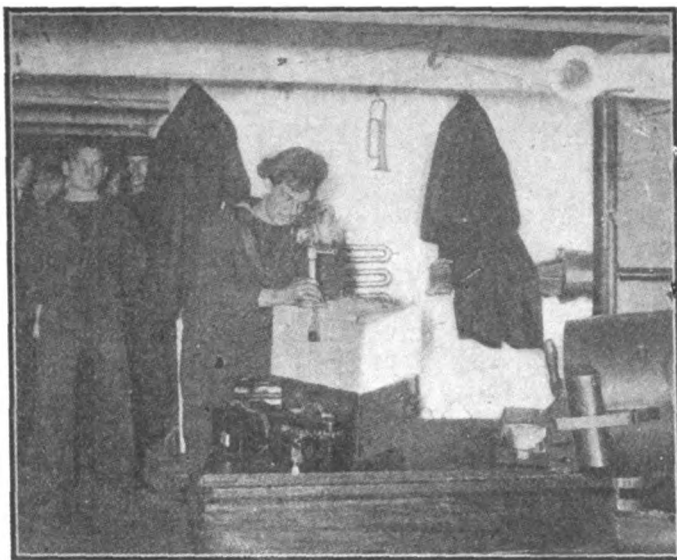
yards apart. According to the published reports, verbal messages were exchanged between the ships for more than an hour with the utmost success, and at the conclusion thereof, the various naval officers expressed themselves much pleased with the results of the trial, and confident of the value and ultimate success of some such system.

The illustrations are reproduced from photographs taken during the trial, and show the interiors of the respective boats where the experiments were being conducted, and indicate both the transmission and reception of a wireless conversation. Unfortunately, the reports do not give many interesting scientific details. Theoretically, there is no reason why wireless telephony

should not be made as successful as wireless telegraphy has been. Consider a little the phenomena of transmitting signals by this method. The usual apparatus consists at the sending

station of an induction coil, one pole of which is grounded, while the other is attached to a mast, kite or balloon whose function is to support a long, vertical, insulated conductor. When a spark takes place the eye readily perceives the flash of light that attends it. The ear recognizes an exhibition of energy in the form of sound, while the hand, if held in proximity to the terminals, de-

fects a sensation of heat. These three manifestations of radiant energy are so familiar that we regard them as mere matters of course. But in addition to the waves which can be recognized by the organs of sight, hearing and sensation, other sets of waves



Wireless Telephone Sending Station on the Battleship Alabama.



The Wireless Station on the Kearsarge, the Chief Electrician Sending a Message.

are initiated to which no organ in the human system will respond, and therefore they flow by, leaving us entirely unconscious of their presence. These waves are the so-called Hertzian waves from their discoverer, and like the heat and sound waves produced by the coil sparks, these waves radiate indefinitely from the terminals throughout space. If some device could be found sensitive to the presence of these waves it is quite evident that intelligence could be transmitted from one point to another by arranging such a predetermined code of signals as is represented by the Morse alphabet. Professor Branley was the fortunate discoverer of an exceedingly sensitive apparatus capable of detecting the presence of these Hertzian waves. This is the coherer, which consists of a little glass tube in the center of which a pinch of metallic filings is placed. Now it is found by experiment that if a local circuit be provided, including a battery and bell and the coherer, the resistance of the filings is so great that no battery current will flow and the bell remains silent. If an induction coil

set at a distance be excited, the Hertzian waves emitted by the sparks impinge upon the coherer and in some way affect the filings and decrease their resistance, allowing the local current to pass, and causing the bell to ring. Such is roughly the operation of a wireless telegraph apparatus, and it needs but little imagination to believe that if the coherer could be so refined as to be sensitive to the waves which would follow the induction of a telephone transmitter into the coil circuit, wireless telephony would be practical.

Several suggestions have been made looking towards this end, but so far they seem to have brought forth but little fruit. To what extent Professor Collins has succeeded in this quest the published details of his work do not state, but the undertaking both from a scientific and from a commercial standpoint, is one of exceeding attractiveness. That wireless telephony will some day arrive appears unquestioned, and we shall hail its advent, no matter by whom introduced, with the heartiest welcome.

HOW TO MAKE KNOTS AND SPLICES

A KNOWLEDGE of knots is advantageous for everyone, and particularly so for a lineman, who, by good rights, should be two-thirds of a sailor, in order that he may be able to quickly and deftly handle the hoisting and hauling apparatus that is a necessity in aerial line construction. Even old salts may learn something of knots, and so for their benefit as well as for the greater number of land-lovers, we reproduce a variety of useful forms of knots and splices. The illustrations are taken from a late number of the *Scientific American*.

The best plan for the novice is to buy a few yards of white cotton clothes line that usually comes in hanks of 20 and 30 feet. Such line is a miniature rope, and as it is soft and pliable, it is easy to practice with. Thus equipped, one may experiment in making the various knots and splices illustrated until such proficiency is attained that any form of knot can be quickly and deftly tied.

Fig. 1 shows the more common hitches which are used particularly in hoisting, and which are time and again of the greatest value. No. 1 is the so-called half hitch, which is common as to be familiar to nearly everyone. No. 2 is known as the timber hitch, and is particularly useful when medium-sized sticks of timber are to be hauled about. No. 3 is a combination of the timber hitch and half hitch, that is particularly advantageous when longer sticks are to be handled. No. 4 is the famous clove hitch that is more frequently used than any other form of rope fastening.

Nos. 5, 6, 7 and 8 are self-explanatory methods of making slings whereby articles of almost any shape or description may be readily attached to a fall for hoisting.

Fig. 2 exemplifies nearly all of the various forms of knots and splices which are of common occurrence, and which are described as follows: 1. Turn used in making up ropes.

2. End tapered for the purpose of passing it readily through a loop. To make this, we unlay the rope for the necessary length, producing a rope diminishing in diameter toward the end, which is finished by interlacing the ends without cutting them, as it would weaken the work; it is lastly "whipped" with small twine.

3. Tapered end, covered with interlaced cordage for the purpose of making it stronger. This is done with very small twine attached at one end to the small eye, and at the other to the strands of the rope, thus making a strong "webbing" around the end.

4. Double turn used for making rope.

5. Eye splice. The strands of the cable are brought back over

themselves, and interlaced with their original turns, as in a splice.

6. Tie for the end of a four-strand rope.

7. The same completed; the strands are tied together, forming loops, laying one over the other.

8. Commencement for making the end by interlacing the strands.

9. Interlacing complete, but not fastened.

10 and 11. Shell in two views used in No. 65, showing the disposition of it at the throat. This joining is advantageous, as

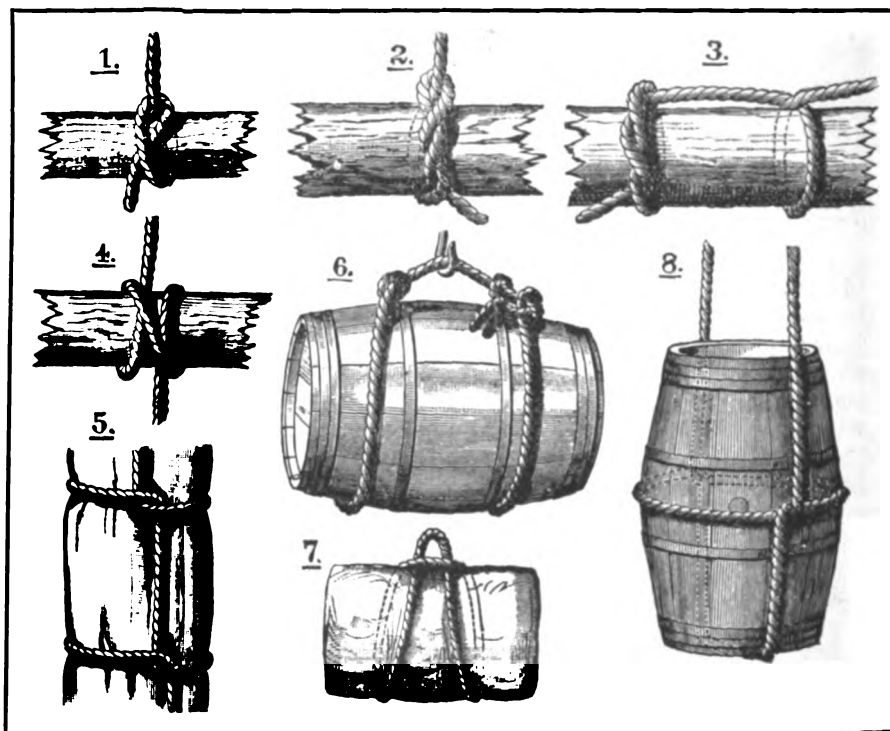


Fig. 1. Some Commonly Used Hoisting Hitches.

it does not strain the cords, and it prevents them from cutting each other; so that the rings pass one into the other, and are joined outside the intermediate shell.

12. Interlacing in two directions.

13. Mode of finishing the end by several turns of the twine continued over the cable.

14. Interlacing commenced, in one direction.

15. Interlacing finished, the ends being worked under the strands, as in a splice.

16. Pigtail commenced.

17. Interlacing fastened.

18. Pigtail with the strands taut.
 19. Dead-eye, shown in two views.
 20. Pigtail finished. We pass the ends of the strands, one

21. Scull pigtail; instead of holding the ends by a tie, we interlace them again, as in No. 16, the one under the other.
 22. Pigtail, or "lark's nest." We make this to the "penant"

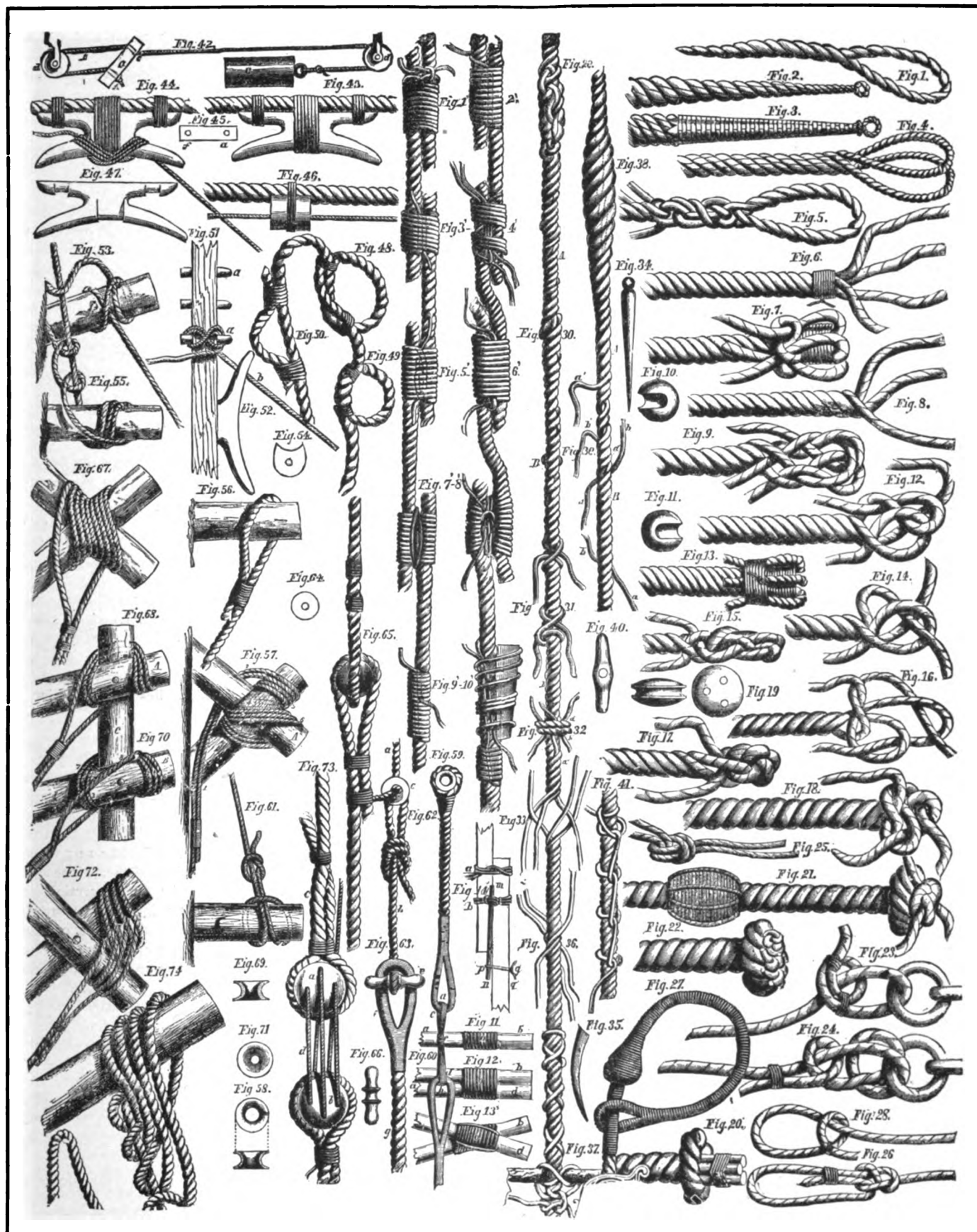


Fig. 2. Showing Methods of Making Up and Tying Many of the Various Knots Used in Practical Work.

under the other, in the same way as if we were making a pudding splice; thus bringing it in a line with the rope, to which it is seized fast, and the ends cut off.

of a cable, which has several strands, by taking the requisite number of turns over the pudding, in such a manner that the strands shall lie under each other. This "pigtail" forms a knot

at the end of the rope. It thus draws together two ropes, as shown in No. 32, forming a "shroud" knot. In these two pigtails, the strands are crossed before finishing the ends, so that the button *a* is made with the strands, *a* and *b*, with those of the rope *b*.

23. Slip clinch to sailor's knot.
24. Slip clinch, secured.
25. Ordinary knot upon a double rope.
26. Bowline knot for a man to sit in at his work.
27. Called a "short splice," as it is not of great length, and, besides, can be made quickly.
28. Slip clinch.
29. Splice, as described in No. 33.
30. Long splice. This extends from *a* to *b*. We unlay the strands of each of the ropes we intend to join, for about half the length that the splice will be, putting each strand of the one between two strands of the other.
31. Simple fastening on a rope.
32. A "shroud" knot.
33. The ends of the rope are prepared for making the splice (No. 29) in the same manner as for the "shroud" knot in No. 32. When the strands are untwisted, we put the ends of two cords together as close as possible, and place the ends of the one between the strands of the other, above and below alternately, so as to interlace them as in No. 29. This splice is not, however, very strong, and is only used when there is not time to make a long splice, which is much the best.
- 34 and 35. Marlin spikes. Tools made of wood or iron, used to open out a rope to pass the strands of another through it.
36. Shows strands arranged as described in No. 30.
37. Fastening when a lever is used, and is employed when hauling upon large ropes, where the strength of several men is necessary.
38. A "pudding splice." This is commenced, like the others, by placing the rope end to end, the turns of the one being passed between those of the other; having first swelled out the yarns by a "rat's tail," we put them, two by two, one over the other, twisting them tightly, and opening a way for them with the marlinspike. The inconvenience of this splice is, that it is larger in diameter than the rope itself; but when made sufficiently long, by gradually reducing the size of the strands, it has great strength.
39. Shows two strands, *a* and *b*, of the ropes, *A B*, knotted together, being drawn as tight as possible; we unlay the strand, *a'* of the rope, *A*, for half the length of the splice, and twist the strand, *b'*, of the rope, *B*, strongly in its place, tying *a'* and *b'* together tightly. The same process is again gone through on the rope, *B*, the strand *a''*, of the rope, *A*, being knotted to the strand, *b''*, of the rope *B*. When all the strands are thus knotted together, we interlace them with the strands of the cable. Thus the strands, *a a' a''*, are interlocked by being passed alternately above and below the turns of the cord, *B*, the ends being also sometimes "whipped." In the same manner the strands, *b b' b''*, pass alternately over and under the strands of the rope, *A*, and are in like manner "whipped." It is important that the several interlacings and knots should not meet at one point; we reduce the size of the strands toward the end, so that they lose themselves in the body of the splice, cutting off such parts as may project. This splice is employed for joining the ends of a rope when a chafed part has been cut out, and is quite as strong as the rope itself.
40. Belaying pin opened to serve as a button; these are used where it is necessary to stop or check velocity.
41. Chain knot, or fastening.
42. Variable or regulating lashing. By laying the piece, *a f*, horizontally, it can be slipped along the rope, *b*; by raising or lowering this, we shall raise or depress the weight, *c*, the cord, *b*, running over the two pulleys, *d*, from the piece, *a f*, in the direction shown in the figure. The friction of the cord, *b*, passing through the hole, *e*, sufficiently fixes the piece, *a f*, and holds the weight, *c*, securely.
43. Cleat, with three ties.
44. Cleat, showing the mode of belaying the cord.
45. The piece, *a f*, of No. 42.

46. Fair leader.
47. Cleat to be fixed to a stay.
48. Loop for slipping other lines.
49. A "bend" which is only used for fear of the stoppers snapping.
50. Bastard loop, made on the end of the rope, and whipped with yarns.
51. Tie to pins: *a*, the pin; *b*, small cords fixed by a cross tie.
52. Cleat, fixed to the "rail," either with screws or nails, to which the lines are belayed.
53. Waterman's knot.
54. Fair leader.
55. Tie, or bend to pier.
56. Simple fastening to tie.
57. Fastening by a loop. This can be tied or untied without loosening the loop itself. It is made by following, toward the longer loop, the direction as numbered 1, 2, 3, 4, 5, and is terminated by the loop, 6, 7, 6, finally passing it over the head of the post, *A*. This knot holds itself, the turns being in opposite directions. To untie it, we slack the turns of the cable sufficiently to again pass the loop, 6, 7, 6, over the post, *A*, and turn the ends in the contrary direction to that in which they were made (as 5, 4, 3, 2, 1).
58. Iron "shell," in two views.
- 59 and 60. "Wedding" knots; *a*, *b*, eyelets; *c*, *d*, the join; *e*, the fastening.
61. Lark's-head fastening to running knot.
62. A round turn; the cord, *a*, is passed through the bight of the cord, *b*, over the button, *c*, where it is secured by an ordinary knot.
63. Belaying-pin splice. The cord, *b*, "stops" the pin, *c*, its end being spliced upon itself, and "served" with yarn; this rope, with its pin, is passed through the spliced eye, *f*, of the line, *g*.
64. Round button.
65. Joint by a spherical shell, each loop, *a* and *b*, being made by ties and splices, and surrounding the shell, *c*.
66. Belaying-pin, shown separately, before being stoppered.
67. Fastening to shears.
68. Square mooring. When the cable is round the post, *A*, and the piece, *c*, without being crossed, it lies in the section 1, 2, 3, 4, 5, 6, 7, and the end is fastened by tying.
69. Wooden shell in section.
70. Crossed fastening. The turns of the cable, passing in front of the post, *B*, are crossed at the back of *C*, in the direction 1, 2, 3, 4, 5, 6, 7, 8, the end, 8, being secured to the cable.
71. Wooden shell.
72. Double-chain fastening.
73. Lashing for "ram" block, or "dead-eye." The ram blocks, *a* and *b*, are strapped by the cords, *e*, which hold them; the small lanyards, *d*, pass through the holes to make the connection, and as they are tightened give the requisite tension to the cordage; the ends are fastened to the main rope. Usually one of these dead-eyes is held by an iron strap to the point where it is required to fix and strain the cordage, which is ordinarily a shroud.
74. Chain fastening.
- 1'. Simple band, showing the upper side.
- 2'. The same, showing the under side and the knot.
- 3'. Tie, with crossed ends, commenced; a turn is taken under the strands, to hold the ends of the cord.
- 4'. The same, completed.
- 5'. Bend with crossed strands, commenced, the one end being looped over the other.
- 6'. The same, completed.
- 7'. Necklace tie seen on the upper side.
- 8'. The same, seen underneath. The greater the strain on the cords, the tighter the knot becomes.
- 9' and 10' are similar splices to 7' and 8' with slight modifications.
- 11' shows the commencement of 13', the legs in elevation; 12' being a front view. An ordinary band, made by several turns of a small rope, is lapped round them and hauled taut, and then interlaced at the ends. This done, the legs are shifted into the

shape of a St. Andrew's cross. Thus the lashing is tightened, and, for further security, we pass the line several times over the tie and between the spars, knotting the ends.

13'. Portuguese knot. This is a lashing for shear legs, and must be tight enough to prevent the spars slipping on each other; the crossing of the two legs gives a means of securing the knot.

14'. For binding timbers; *a*, knot commenced. Take several turns round the timbers and fasten the ends by passing them

under the turns; *b*, knot completed. The end of a round stick, *m n*, termed a packing stick, should be passed under the knot, the cord being slack enough to allow of this. By turning the stick, the turns can be tightened to any extent; when tight, we fasten the longer arm of the lever to some fixed point, by a rope, *p, q*, so that it cannot fly back. Care must be taken not to turn the stick too far, or the rope may be broken. As the timber dries and shrinks, the lever may be used to make all taut again.

AN AMERICAN ENGINEER'S OBSERVATIONS IN EUROPE

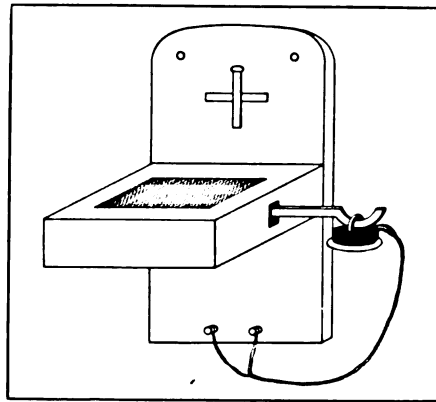
By T. LIDBERG.

THIS is written in Malmo, Sweden, Where I have just arrived after having visited several countries in Europe. The telephone instruments as well as the operating methods in use in Europe cannot in any way compare with those in use in the United States. In every place visited a point was made of trying to see officials, but most cases were unsuccessful, as everybody seemed to be on their vacations. In London, Mr. Dalgell, district manager of the National Telephone Company, Limited, was called on. He was much interested in American telephony and proved a fine host. Ten miles were traveled by Mr. Dalgell and the writer to see the Kensington exchange.

The Kensington exchange of London has about 5,000 lines and all Ericsson equipment. The construction is fairly good, but the operating is very slow indeed. The company is aware of it and have started to change a few boards into central calling (lamp signal) with local batteries for talking. The American central energy system pleased them immensely, though they failed to understand its operation. The condenser especially was a mystery to the average British telephonist. The engineer-in-chief, Mr. Gill, was not in town, but was expected at any time.

The telephone system in Paris was worth forfeiting part of one's life to inspect. Paris certainly leads in poor equipment as well as in construction. One is not permitted to look at the switchboards except through a window, but that is sufficiently

satisfying. It looks as if they had a job lot of the oldest style switchboards. The telephones took the cake. The writer tried his best to buy or steal one, but could not succeed. They consisted of a wooden box which looked something like the sketch. A common vibrating bell is used for a signal and a push button for calling. The shaded place on the top of the lid is the diaphragm of the transmitter, which consists of little carbon sticks



touching each other. To hear and see a Frenchman talk through one of these is something worth traveling far to see. The general manager of the Paris company refused to be seen. The inside construction was very poorly done. In some large hotels and stores they had what they called long distance telephones which were desk telephones equipped with ordinary transmitters and receivers of some French make. The writer talked over one of these affairs to Sevres, a place about twenty-five miles from Paris, and had difficulty to understand what the man at the other end was saying, and he was an American, too. The whole system is controlled by the state.

One German exchange was visited in the town of Köln. It was only a small one, but the instruments and construction were fair. Bremen and Hamburg both had very nice instruments, but neither of the exchanges were visited. I tried telephoning to my old home over the Swedish government's long distance outfit, which is of their own manufacture, and did not find the service particularly good.

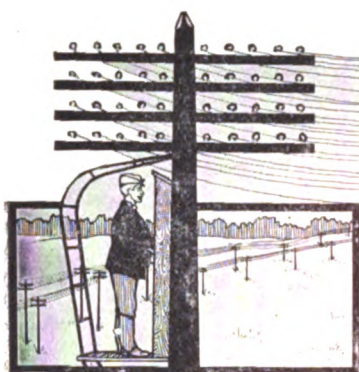
AN EARLY TELEPHONE

THE supposed inventors of the telephone are so many, and their number is so constantly increasing, that the claims of a certain Charles Bourseul, whose electric telephone was described in French and German periodicals in 1854, may not be without interest," says the *Scientific American*. "In a German daily newspaper which bears the strange title *Didas-Kalia*, of Frankfort-on-the-Main, there appears in the issue of September 28, 1854, a rather fantastic description of the wonderful achievements of Bourseul. After rhapsodizing on the 'wonders with which electricity has lately surprised us,' the author mentions a new invention 'which will not only revolutionize telegraphy, but will also immeasurably extend its usefulness.' The invention in question, we are told, is nothing more or less than the electric transmission of speech, and springs from the fertile brain of Charles Bourseul, a soldier of the army of Africa, in 1848.

"It must be confessed that Bourseul had the right idea. An electric current passing through a wire energizes a piece of wrought iron with which it is in contact, and converts it into a magnet. As soon as the circuit is broken, the wrought iron is demagnetized. The electro-magnet thus constituted is able alternately to attract and release a movable plate, which, by its coming and going, produces the conventional signs used in telegraphy. Bourseul thought that if a metallic disc could be invented which

would be so movable and flexible as to respond to all the vibrations of sounds (as does air), and that if this disc were placed in a circuit so that it could make and break the current at every impact of the air vibrations, it would by the same means be possible to cause a second similar metallic disc to repeat the vibrations in the first disc in equal time. Hence, the ear placed at the second disc would be affected as if it received the sounds directly.

"The author of the article is so imbued with the possibilities of Bourseul's invention that he informs us, 'if the idea is carried into effect, then the electric telegraph will be of the past.' It is, indeed, clear enough that Bourseul had the telephone in his grasp not only before Bell, but even seven years before Philip Reis produced his famous make-and-break musical telephone at Frankfort. Bourseul, however, seems not to have gone so far as to produce a working instrument adapted for actual use. Furthermore, he probably knew nothing at all of the undulatory theory of the current, upon which articulate speech depends. For that reason the courts have ignored Bourseul's apparent claims to originality in the production of the telephone. Bourseul's case is rather striking, for it is the case of a man who had to make but one short step in order to realize an idea, which, only many years later, was practically carried out."



The Operating Field

W. W. DEAN AND A. E. BARKER ORGANIZE NEW TELEPHONE MANUFACTURING COMPANY.

THE Dean Electric Company is the name of a new telephone manufacturing company which was recently incorporated under the laws of the State of Ohio by Samuel D. Rawson, I. H. Griswold, T. M. Brush, A. E. Barker and W. W. Dean.

The company is capitalized at \$300,000, and will erect a modern factory at Elyria, Ohio, it having acquired a site adjacent to and extending 1,100 feet along the main line of the Lake Shore Railway. The officers are: Samuel B. Rawson, President; William W. Dean, Vice-President and Chief Engineer; T. M. Brush, Treasurer; and A. E. Barker, Secretary and General Manager.

Messrs. Rawson, Griswold and Brush are well known in Independent telephone circles, they being the founders and builders of a large number of exchanges in the States of Ohio and New York. Among these are exchanges at Albany, Schenectady, Cohoes, Niagara Falls, N. Y., Elyria, Ohio, and numerous others. They are also the prime movers in the Independent long distance service in these States.

A. E. Barker has been in the Independent telephone business for a number of years, he being one of the engineers and builders of the Detroit and New Orleans exchanges. In addition to this experience he has been actively identified for a number of years with the Kellogg Switchboard and Supply Company, of Chicago, in an engineering capacity, and more recently as manager of the sales department.

Mr. Dean has been connected with the telephone business for about 22 years and has been with the following companies:

The Bell Telephone Co., of Missouri, at St. Louis; The Union Telefonica Co., Buenos Ayres, South America; The American Bell Telephone Co., Boston; Western Electric Co., Chicago; and Kellogg Switchboard & Supply Co., of the same city.

Both Mr. Barker and Mr. Dean sever their connections with the Kellogg Switchboard and Supply Company on January 1.

ENGLISH JOURNALISTIC FEAT.

IN a recent issue of the *Scientific American*, there is an interesting account by the English correspondent of the use of the electrophone by the London *Evening News*, which reported the speech of Joseph Chamberlain at Birmingham, and published it complete in London within twelve minutes of the speaker's resuming his seat.

Birmingham is 113 miles distant from the English metropolis. In the London editorial office of the *Evening News* an electrophone receiving station was established, comprising twelve receivers. At the hall where the speech was delivered, just in front of the speaker, were arranged on all sides electrophone transmitters in small boxes. The wires connected thereto were switched onto the wires of the National telephone system, which were carried into the hall for this purpose. These wires led to the Birmingham post-office, where they were switched through onto the trunk cable to London. At the metropolitan post-office they extended to the National Telephone Company's exchange, and thence to the newspaper office.

The task of reporting the speech was carried out by ten reporters, and their work was divided into two-minute spells of reporting, subsequently reduced to one-minute intervals as the speech neared completion. That is to say, the first shorthand reporter was connected to the wires for two minutes, then gave way to the second reporter, who also had a two-minute interval, and so on with the whole of the ten men in rotation. Then while No. 2 was reporting, the first shorthand writer who had been relieved transcribed his notes and was ready for another spell of reporting, after the tenth man had completed his two minutes. In this manner the whole speech was reported verbatim et literatim. Then as fast as the shorthand notes were transcribed they were handed to the linotype operator, and the speech was composed and made ready for printing.

To guard against risk of breakdown of the cable, two other trunk cables were held in reserve, but the first cable proved sufficiently reliable for the work.

By this enterprising development the newspaper was enabled to obtain its report and publish the newspaper more than an hour before the first complete telegraphic report was received.

Mr. Chamberlain commenced his speech at 8.10 in the evening. The first batch of copy was sent to the composing room and set at 8.22. Mr. Chamberlain sat down at 10.05; the last batch of copy was sent to the linotype operator and set at 10.20. The type was cast, printed and on sale in the street at 10.32, and the last batch of the telegraphic report was not received until 11.37, so that the electrophone beat the telegraph by 1 hour and 5 minutes.

The speech was set up and made up into columns from end to end, even including the last passages, which were not issued in the stop-press news space. Had the stop-press column been utilized for the last passages of the speech, the paper might have been published earlier.

The enterprise was purely an experiment, but was so successful that in future the electrophone will play an important part in the report of a great speech, since it is now realized that distance does not militate against the successful operation of the instrument.

THE FEDERAL COMPANY'S AFFAIRS.

PRESIDENT DICKSON and General Manager Hoge, of the Federal Telephone Company, are meeting with much success in securing signatures to the extension of the debts of the company for a year from April next and practically all are signing up. A few, however, who have preferred to make settlements in other ways are accepting bonds and stocks for their claims and the indebtedness of the Federal is slowly being whittled down. About a year ago President Dickson made an estimate of the assets of the Federal Telephone Company and the Everett-Moore assets which were pledged for the payment of the Federal Telephone debts. These assets showed a total of about \$10,000,000 figured at a very low price. Against these debts the telephone company and the syndicate had total debts of about \$6,000,000. It is encouraging to know that in the sale of the Federal Telephone's interest in the Mansfield plant, the Federal Telephone Company secured \$50,000 more than the securities

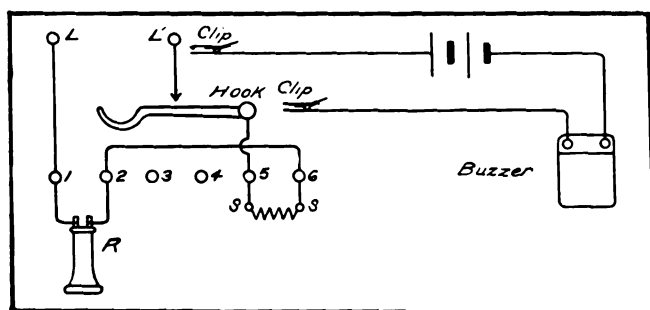
were down for in the estimate mentioned above. In the sale of the Lima plant, announced some time ago, the Federal Telephone Company secured \$30,000 more than Mr. Dickson had the Lima plant appraised at in his list of assets.

INSPECTOR'S TESTING APPARATUS.

BY CHAS. AMBER.

IT is often quite handy to a telephone inspector to have a simple testing apparatus with him while he is making his rounds.

The one here described is easily made, and will be found practical. It requires but a couple of small dry batteries, vest-pocket size, and a small buzzer. The dry batteries and buzzer can be carried in the pocket or a better arrangement is to mount them in a small box with a pair of flexible cords, to the ends of which snaps are soldered. Old suspender snaps will be found to answer the purpose admirably. When a station is in trouble the inspector can usually quickly decide whether it is the primary or secondary circuit that is at fault. The figure represents the



secondary circuit of a telephone sub-station instrument. Supposing an open is suspected that cannot be easily located, the inspector attaches one snap from his buzzer to the line post *L'* and the other he touches to the hook switch. If the buzzer sounds here, he is sure that that part of the circuit is closed, and then touches bind post number 5, still leaving the first snap at *L'*. If the buzzer fails to sound at 5 it is evident that the trouble is in the wire between the switch hook and the bind post 5. If, however, the buzzer sounds at 5, and does not at 6 it is evident that the open is in the secondary of the induction coil. The buzzer is better than a telephone receiver for this sort of work as enough current to make a distinctly audible click in the receiver might flow across a partial open, while the buzzer, under the same circumstances, would not sound.

SERMON BY TELEPHONE.

BY the aid of the telephone a sermon preached by Rev. D. H. Cooper, a noted and eloquent divine of the First Baptist Church, of Peru, Ind., can be heard in Logansport and Wabash, and by many people quite a distance from the church. A transmitter is placed in front of the pulpit and connected with the Home Telephone Company's exchange. The experiment has proven so successful that other cities and patrons are asking to be connected.

RUIN CAUSED BY TROLLEY CURRENTS.

IN two recent instances ruin came to telephone plants in Indiana because of trolley wires. At Lebanon all the telephones were burned out, and the plant badly damaged. The telephone company's workmen were stringing new cables when the rope broke, letting the wires drop upon the trolley wire of the Indianapolis & Northwestern Traction Company. The cable was burned in two, and all the telephone drops and practically every instrument in the town was burned out. Several small fires occurred by the burning out of the telephone wires. The loss to the telephone company will be very heavy.

At four o'clock in the morning, two days later, the entire interior of the exchange of the Home Telephone Company was set on fire, the result of a cable coming in contact with a trolley wire of the Indianapolis Northern Traction Company. The

trolley wire was raised four feet to allow a house to be moved across the track, and touched the telephone wires. Over two hundred instruments were burned out and all the telephones in the city rang. Many patrons who answered the call were shocked and several were burned. The night operators left the exchange hurriedly and called the fire department. A great deal of the apparatus was destroyed and the loss will reach several thousand dollars. The Home Company is the pioneer independent company of the State, being the first organized for operation. A cable of the Central Union Company was melted in two by the same current.

THE CUMBERLAND OUSTED FROM EVANSVILLE.

JUDGE ANDERSON, of the Federal Court, rendered an important decision in Indianapolis on December 29th in the case of the Cumberland Telephone Company *v.* The City of Evansville, in which he dismisses the injunction proceedings and holds that the city has a right to order the removal of all poles and wires and other property of the company from the streets and alleys of Evansville, and that the Cumberland Company has no right to operate in the city. Judge Anderson holds that a corporation has no power to sell its property and its business unless the franchise and ordinance under which it is operating specifically provides for its sale and transfer.

It was shown that the city council passed a resolution declaring the company to be operating without a franchise; that its franchise had expired by limitation and refused to renew it. The council thereupon ordered the company to remove its poles and wires from the streets and alleys within 90 days under penalty of removing them at the company's expense. The company sought an injunction, and in its complaint alleged that the right to the streets and alleys of the city, granted by the council in 1882 to the Evansville Telephone Exchange, became the property of the complainant, together with all other property, when the transfer was made in 1883. The answer of the city of Evansville alleged that it was outside the powers granted the original company by the council in 1882 to sell.

At that time the Evansville Telephone Exchange became the property of the complainant, together with all other property, when the transfer was made in 1883. The city's answer also alleged that to sell the property was contrary to public policy. Judge Anderson further held that the Cumberland Company has no rights by the assignment of the Evansville Telephone Exchange and no rights under the ordinance of 1882, which it can ask the court to protect. The bill was therefore dismissed and the restraining order dissolved.

The effect of the ruling leaves no room upon which the Cumberland Company can stand, and unless the matter can be held off by an appeal the Cumberland Company will have to remove its poles and wires from the city. In that case the New Municipal Company, recently organized and granted a franchise to install and operate a telephone plant in the city, will have a monopoly of the business. However, Evansville cannot do without telephone service, and it is generally believed that the Cumberland Company's plant will be sold to the new company. The Cumberland Company has greatly improved its plant, built a new \$6,000 exchange building, installed a new switchboard and made other modern improvements. Now that it is without rights to conduct its business, there is nothing to do but surrender to the Municipal Company or remove its property from the streets.

TELEPHONE COMPANY REWARDS FIREMEN.

FIRE MARSHAL C. B. STILLWAGON, at Uniontown, Pa., was notified by the Tri-State Telephone Co. that a new telephone will be placed in the department's room in the City Hall. This is a token of appreciation from the company for the good work the department did one evening in saving the big telephone cables which were near the Mervis livery stable which was almost destroyed by fire. Had the fire communicated to the cables, or even had the heat around them become intense, the metallic casing would have melted and the cables spoiled.



BELL PRESS BUREAU METHODS.

ONE OF ITS FAVORITE TRICKS.

THE AMERICAN TELEPHONE JOURNAL has called attention from time to time to the reprehensible advertising methods of the Bell telephone people. There seems to be an active, efficient and unscrupulous press bureau, or several of them, in connection with the Bell monopoly, and the plan of these bureaus is not so much to exploit the merits of the Bell systems as to misrepresent the Independent movement.

For example, recently the press in all parts of Western New York printed the following telegram from Jamestown, under the significant caption, "Independent No Longer:"

The Independent Telephone Company of Cherry Creek has passed into the hands of the New York & Pennsylvania Telephone Company—the Bell company—which will overhaul and extend the system. It is proposed to extend the line to Balcom and Villanova and probably to other villages in the vicinity.

Here, on the face of the returns, is an Independent telephone company which has been unable to stand the pressure and get the business, and has been absorbed finally by the great and good Bell monopoly. But what are the facts in the case?

The telegram relates to the Cherry Creek company passing into the hands of the New York and Pennsylvania Telephone company. That such a transaction took place is true enough. The property passed to the Bell company named at a loss to the local people, we understand of about \$150. As a matter of fact, the Cherry Creek company was never an Independent company. Advertising it as such is only a part of the Bell scheme of misrepresentation. The Cherry Creek company was organized, not by Independent, but by Bell men, although it was somewhat local in character. There were certain guarantees made to the local people that if the venture did not prove profitable the Bell company would take the property off their hands. This was done at a loss to the local people of about \$150.

Now, here is an apparently authentic telegram from an apparently disinterested source, spreading broadcast the news of the failure of an alleged Independent telephone company. A novice might be deceived. A local capitalist, planning to invest in telephone properties, might be deceived. But those who have watched the methods of the Bell people since first the Independents began to interfere with the monopoly they had fastened upon the country, know this to be one of a series of systematic misrepresentations which the Bell people have made, not only in Western New York, but throughout the West.

If the scheme were honest, one might admire the ingenuity of and applaud the persistency of the attack. But it is no more honest than a blow which stabs in the back under cover of darkness in honest warfare. Look at the cunning of the plot. The Bell people by making certain representations and promises to local people induce them to organize a telephone company. In the nature of things it is a Bell company. It can not by any possibility be an honest Independent company. Yet, it is heralded

far and wide, through some mysterious influence, as an "Independent" property. In the course of time when conditions are ripe, the Bell people play their trump card. They absorb the "Independent"

property and their press bureau does the rest. In all parts of the country, investors, Independent operators, the lay public, if they do not understand the situation, pick up their morning papers, shake their heads and say, "Too bad, too bad! Here's another Independent telephone company gone to the wall."

The more one thinks of it the more the diabolical ingenuity of the plot is impressed upon him. The attack is difficult to meet because of the well known fact that truth can never overtake a lie. The lie goes forth with all the semblance of truth and when the real truth tries to counteract the false impression thus given, it finds that the lie was read by thousands of people who never see the truth at all.

Notwithstanding this, THE AMERICAN TELEPHONE JOURNAL does not propose to stand by mute and see the public hoodwinked in this shameless manner, but will continue to expose such misrepresentations and such methods with all the power at its command.

This is getting to be a favorite plan of attack on the part of the Bell people. Our attention has been called repeatedly to cases just like this one at Cherry Creek, where local companies have been stimulated and even organized by Bell influences and advertised as "Independent," only to become a part of the Bell system openly and with all the publicity possible as soon as the conditions are ready for the change.

Let no man be deceived. Honest Independent companies are nowhere being absorbed by the Bell people, and will not be as long as they keep themselves free from entangling Bell alliances in whatever shape or form they may present themselves. On the contrary, in county after county and district after district, they are actually driving out Bell competition. The Independent activity and their own extravagant mismanagement has bankrupted more than one Bell concern. A few weeks ago we gave figures and statistics showing how and where in the great State of Illinois the Bell companies are being gradually put out of business. This is equally true in other States as the tremendous growth of Independent telephony will testify. In the future the development of telephony seems destined to be along Independent lines, and today, notwithstanding this press campaign of misrepresentation, the Independent systems stand on a solid basis and Independent telephone securities afford a business investment at once safe and desirable.

The significant part of the whole transaction lies in the fact that this once great monopoly, the American Bell Telephone company, is reduced to such a state and must resort to such miserable methods which would make an ordinary business man hide his face in shame.

THE LINE IS BUSY*

BY LELAND HUME.

WHEN you meet a man engaged in any commercial pursuit, whether he be manufacturer, commercial prince, or railroad magnate, and ask him, "How is your business?" and he answers, "I'm busy," you congratulate him by saying, "Good," but when you call upon that most useful business facility, next to railroads, of modern times, "the telephone," for a number, and the voice of the operator answers "busy," you neither feel nor answer, "Good," and you sometimes go as far as to criticize the telephone management, or question the truthfulness of the operator making the reply. This naturally leads to the conclusion that the telephone-using public—and this embraces nearly everybody—is lacking in information upon this subject, and, therefore, in answer to the question, what is "busy?" we reply that "busy" in telephone parlance means that the number with which you wish to communicate is already connected with someone else.

"Busy" does not mean that the force of operators in the exchange is overcrowded with calls, or that the facilities provided by the telephone company for making connections are inadequate. The busy exchange is simply the reflex of the busy town. The next thing to communicating with a man through the telephone is going to see him. Suppose you start out in the morning without having made appointments in advance, and visit the offices of ten business and professional men. Do you believe you would be able to gain access to each of these men promptly upon reaching their respective places of business? Is it not a certainty in a number of cases that you would be informed that the party you desired to see was "busy," and that it would be necessary for you to either wait or call again? Is not this the experience of every man who attempts to communicate in this manner? We think it is. Why, therefore, should there be anything strange or any cause for criticism by reason of the fact that you call by telephone for these same men and get the report "busy?"

Some have charged that the operators make this reply in order to save themselves trouble and work. This is not, in our opinion, a warranted conclusion, for is it not a fact that when you call for a number and get the report "busy" that in nine cases out of ten you continue to call until you get the connection? If, therefore, you believe that the operator is likely to be tempted to do the thing that would give her the least trouble, annoyance and work, then you must of necessity admit that she will give you the connection upon the first call if she possibly can. This is the easiest thing for her to do.

"Busy" is the condition of the telephone service brought about by the users, and not by the company. "Busy" is the connecting link between the telephone company and the electrical engineer. The day is in the distant past when any operating company would undertake to build a plant without first consulting its engineering department, and calling upon that department for plans and specifications. The engineering department requires certain accurate data in advance of submitting these specifications. The telephone company, through its electrical engineering department, provides ample facilities for promptly handling the calls of its customers, and for carrying maximum loads, and this provision is so complete that the word "busy" would be almost dropped from telephone usage were the patrons of telephones to provide themselves with the same ample telephone facilities that the wholesale and retail merchant, that the manufacturer, that the broker, that the railroad people, provide in the way of clerks to meet, wait on and traffic and trade with their customers.

Often you will find a man doing a very large business and employing a large amount of clerks, and not hesitating to add to the number a \$50, \$75 or \$100 man in order to more promptly wait upon the customers that come to his door, and yet you find this same man attempting to let all of his customers in and out

over one single telephone line, and you will find him reporting to the telephone manager that this, that or some other customer of his tried to get him the other day and could not because the operator reported the line busy. After the electrical engineer's department in the telephone service provides comprehensive facilities for handling the maximum traffic, thus guaranteeing against the possibility of "busy" as far as switchboard facilities and operator's equipment is concerned, then it is the province of the traffic department to study the load and the requirements and to advise those customers whose calls are delayed on account of "busy," in order that such customers may arrange for the minimizing of this report, and in making this study it is the custom to make once a month a most careful and accurate record of the calls passing through the exchange.

These reports of "busy" can be greatly minimized if the company can secure the hearty co-operation of the telephone users in carrying out its suggestions. It is safe to say that, on an average, one-quarter of a minute per connection is taken up by unnecessary and useless preliminaries in using the telephones. If this is true, and 90,000 connections are made on an average per day, then 375 hours are wasted per day by telephone users on account of these useless preliminaries. If each conversation was started off promptly, and thereby completed one-quarter of a minute sooner, then the number of "busy" reports would be very largely decreased. In other words, this one act would enable each subscriber to secure his connections with fewer reports of "busy." A great majority of "busy" reports made to you by the operators are for people that you know are engaged in transacting a lot of business. These reports of "busy" that are made by the operators are necessary reports. They are not made for the personal gratification of the operator, nor in order to lighten the load carried by the telephone company.

You go to-morrow morning to your office and at 9 o'clock select a number of telephones that are leased by busy men, and call for these telephones in rotation and you will more than likely get several reports of "busy." You follow that by calling for ten of our best, most prominent and most worthy pastors and priests, and you will not receive the same proportion of "busy" replies from the operator. Then select a number of telephone users whom you know are doing little or no business—just barely hanging on—and you will be almost certain to secure immediate connection, with each of them as you call them. "Busy" is not a reproach. It is a condition not brought about by the telephone company. It is an index of the business of the town. If you from this day charge up "busy" in your account against the telephone company, you indict the electrical engineer, and if you do this you indict a most competent and constantly and rapidly increasing body of intelligent and conscientious men.

ALUMINUM'S NEW APPLICATION.

BERNARD, a German experimenter, noting the structure of aluminum, concluded to try it for putting an edge on fine cutting instruments such as surgical knives, razors, etc. To his surprise and pleasure, it acted exactly like a razor hone of the finest quality. Further investigation showed that the metal had other characteristics that made it pre-eminently useful in this direction. When steel is rubbed on it, as for instance, in honing a knife blade, the metal disintegrates, forming an infinitely minute powder of a greasy unctuous feeling that clings to steel with great tenacity, and thus assists in cutting away the surface of the harder metal. So fine is the edge produced that it can in no wise be made finer by the strop, which, used in the ordinary way, merely tends to round the edge. The writer of the paragraph has confirmed most of Bernard's statements, though he believes he can get an edge with the Ouachita (Hot Springs) hone equally as fine as aluminum gives, and equally as rapidly.

* Address delivered before the Engineers' Association in Nashville, Tenn.



Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

INTERFERENCE IN PARALLELING LINES.

OUR city expects to build a light plant. I wish to know if they parallel my telephone lines on the same side of street or 15 or 20 feet away is there any law concerning same in case of damages, provided I give them written notice before lines are constructed. "G. W. C."

YOUR prior occupation of the street does not confer upon you an exclusive right so that you can prevent the city from building its electric light line on the same side of the street or 15 or 20 feet away. Your right in the street, as prior licensee, is such, however, that it must not be substantially invaded by the city's lines. The city is under the duty to so maintain its lines and wires as not to interfere with your right to properly maintain and operate your lines and to transact the business you are authorized by your franchise or law of incorporation to transact. The city is bound to take such precautions and so erect its lines that it will not interfere with your lines. If it does interfere and cause you damage, you may sue for an injunction to restrain it from continuing the interference. *Western Union Teleg. Co. v. Gurney and Scudder E. L. Co.*, 46 Mo. App. 120, 3 Am. El. Cas. 425; *Paris Elec. Light & Ry. Co. v. S. W. Teleg. & Teleph. Co.*, 5 Am. El. Cas. 262, or you may sue for damages.

In answering your question, I have assumed that when a municipality builds an electric light system the same rule applies that holds good in the case of a private corporation. This assumption is based on the rule that when a municipality engages in an enterprise for the private advantage of the community, it is to be treated, in respect to such enterprise, as a private corporation. *Dillon on Municipal Corporations*, 4th Ed., sec. 66.

See also on the subject, *Consolidated Electric Light Co. v. People's Electric Light & Gas Co.*, 94 Ala. 372, 4 Am. El. Cas. 252; *Terre Haute Elec. L. & P. Co. v. Citizens' Elec. L. & P. Co.* (Ind.), 6 Am. Elec. Cas. 193; *Nebraska Teleph. Co. v. York Gas & Elec. Co.*, 27 Neb. 284, 3 Am. Elec. Cas. 364; *Joyce on Electric Law*, Chap. 22.

OUTSIDE ITS FIELD COMMON CARRIER BECOMES PRIVATE.

IN the case of *State ex rel. Thorntown Co-operative Telephone Company vs. Lebanon Telephone Company*, recently decided in the circuit court at Lebanon, Ind., and appealed to the Supreme Court by the defendant, an interesting brief has been submitted by Judge Taylor, counsel for the defendant. The circuit judge held that a company cannot discriminate between companies seeking connection with it, but, as a common carrier of information, must connect with all who apply. With this ruling Judge Taylor takes issue. He argues that the duty to connect with all applicant companies is one impossible of performance. If a company were compellable to exchange with one company it would be compellable to exchange with a hundred or a thousand. The duty which a telephone company owes to furnish impartial service to all is not inconsistent with furnishing special service to some under special circumstances. If the company goes outside of the territory over which its business extends, it ceases to exercise its function as a common carrier in that respect, but becomes a private carrier and is entitled to make its own bargains with whom and on what terms it pleases.

Judge Taylor points out that the Lebanon Company is affiliated with the Independent telephone business of the country and has undertaken to act for the New Long Distance Telephone Company in the county of Boone; that all the telephone companies with whom it has made arrangements for interchange of business are associated with it in this agency. This is a perfectly lawful contract for it to make. The defendant does not need another associate in the long distance business at Throntown. If it did, the complainant is not a suitable associate for the defendant in that business, because it is the agent and correspondent of the Bell Long Distance combination, which is the rival and competitor of the New Long Distance Company. It is impossible, therefore, for the plaintiff to offer to the defendant the same inducements and considerations which have moved it to make the arrangements which it has made for interchange of business with other local companies in the county of Boone. Pending, Indiana, Supreme Court.

TO SECURE RIGHT OF WAY FOR WIRES.

AT the instance of the Maryland Telephone and Telegraph Company, an order has been made by the Circuit Court at Baltimore, Md., requiring the Chesapeake & Potomac Telegraph Company to show cause why an injunction should not be issued restraining it from constructing its wires and poles in such manner as to interfere with the wires of the complainant at the crossing of the lines of the two companies at the corner of Sarah Ann and Pine streets. A temporary injunction was issued pending the hearing of the case. The complainant alleges that the defendant, instead of overbuilding or underbuilding complainant's wires, deliberately sandwiched their wires through the wires of complainant, putting out of service a number of the latter's subscribers. The complainant charges that the wires run by the defendant were dead wires put up only to secure a right of way and interfere with complainant's service. Before securing the temporary injunction, the Maryland Company cut the objectionable wires.

Circuit Court No. 2, Baltimore, Md.

ATTEMPT TO COLLECT PENALTY FAILED.

THE Indiana Supreme Court has affirmed the decision refusing Arthur B. Irwin the penalties he demanded from the Rushville Co-operative Telephone Company for its refusal to connect him with other subscribers while his telephone bill was unpaid. Irwin, who is a lawyer, refused to pay on the ground that the company owed him some money on a little claim assigned to him by one of his clients. He had been delinquent before and the company had given him time in which to pay. Thirty-five other subscribers were also behind in their rents, were being served at the time Irwin was being disconnected, but the Court held his positive refusal to pay except by setting off the bill for labor (which had been assigned to him) against the unpaid rent justified the company in its treatment of him. The company was not bound, the Court holds, to take unpaid labor claims in satisfaction of telephone rentals. Irwin sued for ten statutory penalties of \$100 each for ten refusals to connect his telephone. In the first trial he secured a judgment for \$1,000, which was reversed by the Appellate Court and remanded for a new trial. The second trial resulted adversely and Irwin appealed to the Supreme Court with the above result.

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.

COMBINED CAPACITY OF CONDENSERS.—(256.)

How do you find the combined capacity of two condensers joined as shown in Fig. 256a? Also, how is the capacity of two condensers joined as shown in Fig. 256b found? Can you please give me reasons in each case? F. R. A.

When two condensers are combined, as shown in Fig. 256a, the combined capacity is equal to the sum of the capacities of the two condensers. For example, if, as shown in the diagram, the condenser *A* is of two microfarads, the condenser *B* is of one, the sum is $1 + 2 = 3$ M. F. When the combination is made as in Fig. 256b, the condensers are said to be in series, and then the capacity is equal to the reciprocal of the sum of the reciprocals of the two condensers. For example, supposing condenser *A* to be $\frac{1}{2}$ a microfarad, and condenser *B* 2 M. F. The reciprocal of

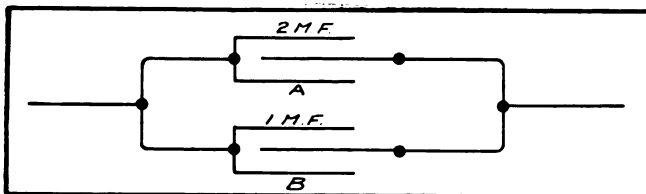


Fig. 256a.

$\frac{1}{2}$ is 2. The reciprocal of 2 is $\frac{1}{2}$. The sum of the reciprocals is $2\frac{1}{2}$ and the reciprocal of $2\frac{1}{2}$ is $\frac{4}{10}$. Therefore, the capacity under these circumstances is $\frac{4}{10}$ (.4) of a microfarad. Stating these principles in algebraic language, if C , C' , etc., are the respective capacities in Fig. 256a, the total capacity is $C + C' +$ etc. In Fig. 256b, if C , C' , etc., represent the capacities, the total

capacity is equal to $\frac{1}{\frac{1}{C} + \frac{1}{C'} + \frac{1}{C''}}$. The complete proof of this formula involves too long a mathematical demonstration to be inserted in the query column.

ON SAME ARM WITH ALTERNATING CIRCUIT.—(257.)

We have an opportunity to run a line for three miles on the same cross arm with a 2,000 volt alternating current circuit. If we do not do this we will either have to put on a cross arm of our own lower down or build our own pole line on the other side of the road. Do you think our line would work all right on the same cross arm with the alternating circuit if we transposed it well? A. I. N.

It is not expedient to run a telephone circuit upon the same cross arm with an alternating current circuit under any circumstances. In many cases such practice is prohibited by law and probably under all circumstances a telephone company indulging in such a practice would be held responsible by the courts for any

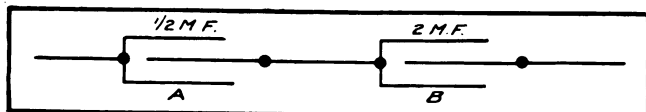


Fig. 256b.

injury. Such a circuit would probably be subject to induction, and it would be difficult to transpose it sufficiently even with a twisted pair to cure such trouble, although the causes producing induction are so unsettled that it is difficult to predict whether or not induction will occur in any specified instance.

THE DIVIDEND MULTIPLE.—(258.)

On the telephones at St. Louis, Mo., there are four buttons, one of which has to be pushed when you ring the central office. Can you tell me what these are for? C. T. T.

In the ordinary multiple switchboard every operator has access to such a number of multiple jacks as will enable her to reach every subscriber's line. When the number of subscribers is very

large this requires an expensive outfit of multiple jacks. In St. Louis the plan of dividing the multiple board into four sections, each of which contains one-fourth of the number of subscribers' multiple jacks, is used. Each substation is provided with four buttons, by means of which the subscriber calling can place himself in connection with that section of the board which contains the jack of the subscriber with whom he desires to converse. Pressing the button signals the desired section of the switchboard. By this means the number of multiple jacks is very largely decreased and the expense of the board reduced.

STORAGE BATTERY QUESTIONS.—(259.)

Why are storage batteries used in preference to some of the better types of primary cells in common battery telephone work? What is the internal

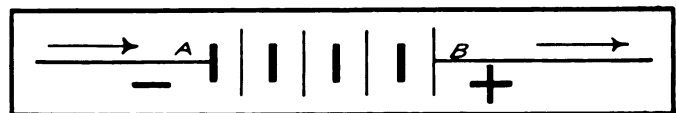


Fig. 259.

resistance of a storage battery such as is used in a common battery exchange of 1,500 lines? How do you find the right charging current for a storage battery? Which line is used to denote the positive side of a battery, *A* or *B* in the picture (Fig. 259)?

First: Storage batteries are used in preference to primary batteries because it is cheaper to charge storage batteries from electric light plants or by the use of charging generators than it is to replenish the primary batteries.

Second: The internal resistance of a storage battery varies with the size of the plates. For an exchange such as you mention the resistance is very low, probably .002 ohm.

Third: The proper charging current of a storage battery depends upon its construction and size and in all cases is specified by the maker.

Fourth: In the accompanying diagram the positive side of the battery is shown by the long line *B* and is marked with a cross.

A SERIES CLEARING DROP.—(260.)

On our switchboard the clearing out drop is in series with the ring side of the cord conductors, and a telephone salesman said that this was partly the cause of the trouble with noisy lines that we are having. He said that this put the lines out of balance and made a drawing which I send you (Fig.

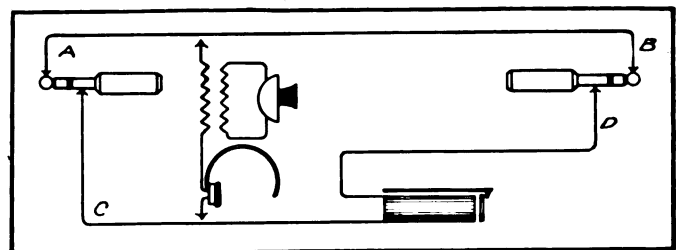


Fig. 260.

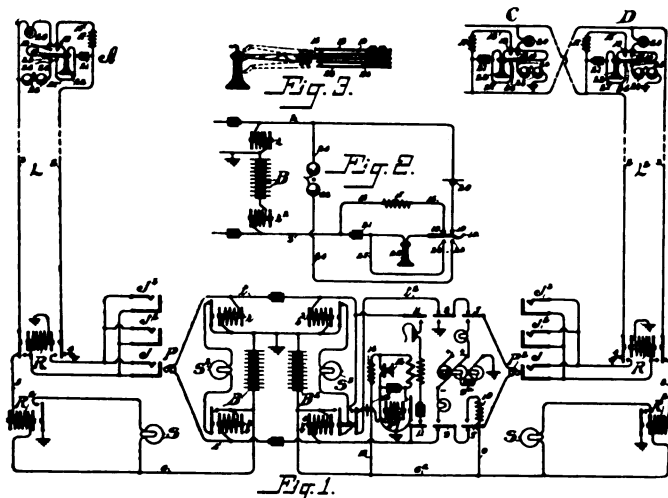
260) to explain it to me, but I could not understand him. Our system is common return. Can you explain to me what he meant by the line being out of balance and why this would make the line noisy? D. E. C.

In the cord circuit which you show the line *A B* is simply a plain wire and contains no resistance or impedance. The line *C D* contains the drop. Evidently the portion *C D* has a greater resistance than the portion *A B*, and for this reason the line is said to be unbalanced. Unbalancing of telephone lines is a frequent cause of unsatisfactory service, and it is much better to have the lines carefully balanced. Instead of placing the drop in series in the line *C D* it would be much better to bridge it across the line, using for this purpose a 500 ohm drop.

PATENTS ISSUED

IMPROVED SUB-STATION CIRCUIT.

William W. Dean, of Chicago, Ill., patents (No. 747,331) and assigns to the Kellogg Switchboard & Supply Company an improved sub-station circuit. This is illustrated in Figs. 1, 2 and 3, in which Fig. 1 is a general diagrammatic representation of a complete circuit. Fig. 2 is an enlarged view of the sub-station wiring, and Fig. 3 the switch hook. The object of this invention is to provide a means of preventing the flow of battery current through the receiver during conversation, and the passage therefrom of the ringing current. Also to prevent the disagreeable click when the circuit is broken. The sub-stations are shown at A, C and D. These are connected by means of the line L with the central office, which is provided with the customary jacks *j* and the cut-off relay *r* and line relay *r2*. The cord circuit is provided with two batteries *B* and *B2*, supervisory lamps *S* and *S3*,

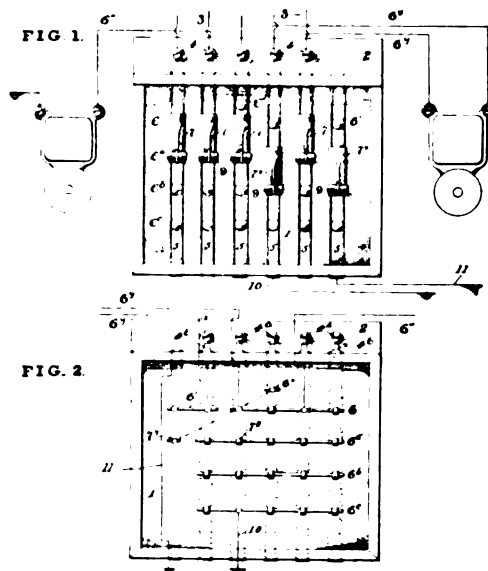


which are actuated by the relays *r*, *r2*, *r3* and *r4*. At the sub-stations the line wire 2 passes through the transmitter 20 to contact 19, the ringer 24 passes from line wire 2 to the lower contact of the switch hook 25. In conductor 3 the receiver is inserted, as shown, and is shunted by a low resistance impedance coil 17. The receiver circuit is opened by the condenser 21, then when the telephone line is in use battery current for the transmitter flows through conductor 2 to transmitter 20, contact 19, contact 18, retardation coil 17, to line wire 2 and common return flows through the receiver. Mr. Dean's invention consists in providing a receiver circuit with two branches, one of which is described above is opaque to the high frequency voice current, while the other branch of this circuit, namely, voice current 3, receiver 22, contact 19 is by reason of the condenser opaque to the battery current. The inventor further provides a branch 27 around the receiver to contact 26. Now, if the switch hook be so arranged that contact 26 is closed an infinite fraction of an instant prior to the opening of the contacts 18 and 19 the receiver is shunted and there is no click

IMPROVED SWITCHBOARD.

James B. Wood, Gate City, Va., patents (No. 746,624) and assigns two-thirds to John E. Smith and G. L. Daugherty, an improved switchboard. This invention is shown in Figs. 1, 2 and 3. The object of the inventor is to provide a simple and convenient switchboard for use in small towns. There is a box or casing, 1, having a ledge, 2, upon the top. The wires from the

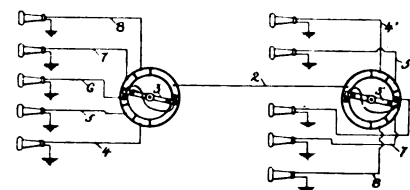
telephone system are connected to the switchboard by the binding post 4, and each joint to a separate pair of parallel bars 5. In the upper surface of the bottom of the casing there are a number of metallic contact points each connected to a wire on the under side of the casing, as at 6. A number of sliding contact pieces, 7, are provided that travel upon the bars 5, and can be placed in



contact with the button 6. From the above description, taken in connection with the drawings, the following described operation will be obvious: Should a subscriber on a party line—say 7x, to the right in Fig. 1—desire to call up another subscriber—say 7y to the left in Fig. 1—the call-bell is rung in the usual manner. The operator at the switchboard slides the contact-piece 7, into contact with contact point or button 6d. He then moves 7x piece (right, Fig. 1) to position over point 7y, Fig. 2, thus making communication between piece 7 and said piece 7x through points 7y and 6x, Fig. 2. The operator then moves the left contact-piece 7x to position shown in Fig. 1, over point 7y, (to the right in Fig. 2) thus establishing communication between the three points of contact-piece 7 (dotted lines, Fig. 1) and the two contact-pieces 7x and completing the circuit between the two subscribers through the connections from the party-lines in the manner hereinbefore described.

MULTIPLEX TELEPHONY.

William Miner, of Plainfield, N. J., patents (No. 745,734) an improved method of multiplex telephony. This device is shown in the figure. The inventor provides two rotating commutators

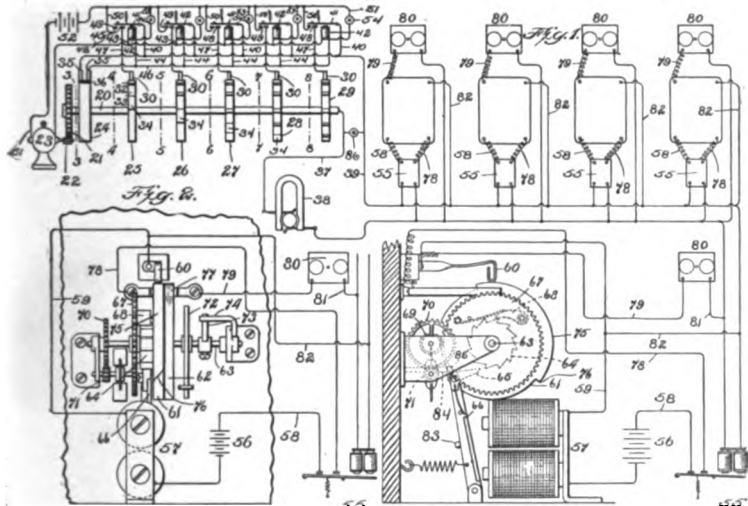


3 and 3'. These commutators have as many segments as there are telephones to be served. Each telephone is connected with its proper segment. The commutators operate under a revolving

arm which carries two brushes, one at each end. One brush is constantly joined to the line, while the other brush, as the arm rotates, passes over the various contacts attached to the telephones. If the arm 3' be rotated it will connect one subscriber after the other with the line, and if the rotation be of a sufficient rapidity so that the ear cannot detect any break, it is evident that a number of subscribers can talk to each other simultaneously over one line without any subscriber being aware that another person is conversing.

PARTY LINE TELEPHONE SYSTEM.

Edward O. Hood, of Hingham, Mass., patents (No. 747,070) a system for party line telephones. The object of this invention is to provide an improved selecting system whereby anyone of a number of receiving instruments on a line may be selected and signalled at the will of an operator without notifying any but the desired instrument. This invention is illustrated in Fig. 1, which shows a general diagrammatic view of the circuit, and Fig. 2 shows a view of the sub-station apparatus. This is a long and

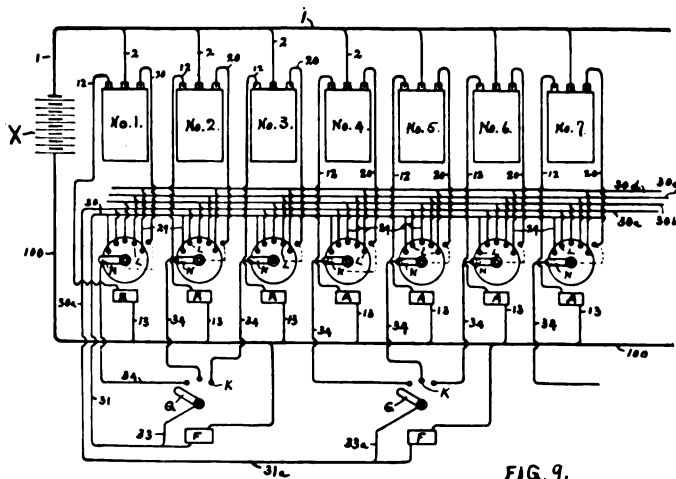


somewhat complicated patent, so much so that it is only possible in an abstract to give the general idea of the method employed by the inventor. Referring to Fig. 1, there is a motor 23, which drives a pinion 22, that is moved to a shaft 20. Upon this shaft there are a series of contact wheels which operate the step by step mechanism shown in Fig. 2. When the operator presses any one of the buttons 54, the motor is started and the shaft makes a complete revolution before coming to rest. A ringing generator 38 is attached to the shaft. There is also a series of magnets 43, one corresponding to each of the parties upon the line. The actuation of this magnet enables the ringing current generator to send impulses over the line when the contact 49 is closed, and thus the proper station is signalled.

PARTY LINE SYSTEM.

T. A. Lundquist, of Chicago, Ill., patents (No. 747,197), a system for signalling party line stations. This invention relates to an automatic exchange in which the calling subscriber selects the subscriber with which he wishes to converse, and is an improvement for similar apparatus (No. 606,764) granted to the inventor July 5, 1898. This is another complicated party line device, requiring six pages of specifications with seven sheets of drawings, and in this digest it is only possible to very briefly explain the intention of the inventor. A diagrammatic representation of the circuit is shown in Fig. 9, in which numbers 1 to 7 inclusive represent the stations, each of which is provided with its own particular main switch, *N*, and in addition there are a number of auxiliary switches, *G*. The inventor proposes to place a main switch for each sub-station, and then to group the main switches into bunches of nine or ten, each one of which is provided with its auxiliary. From each one of the contact points on an auxiliary switch a wire runs to the normal contact of a different main

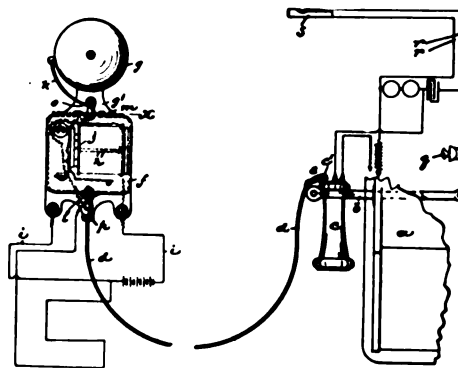
switch. Referring to Fig. 9, each main switch is placed directly under the telephone to which it belongs, and the main switches are shown arranged in groups of three. If telephone number 2 wishes to talk to number 6 he would know by a suitable directory



that it was on the second auxiliary of the third point. The subscriber would, therefore, move his point *N* two steps, which would connect with line 30a, 31a to magneto *f* of the second auxiliary. He would then move the point at *G* to the third point, which connects to the normal at 6. Connection would then be completed, and conversation could then be carried on.

TELEPHONE ALARM SYSTEM.

John D. Peachy, of East Orange, N. J., patents (No. 745,235) an improved telephone alarm system. This invention is shown in the figure. The sub-station is provided with a vibrating bell, *G*, that is connected to a thermostatic circuit so arranged that in case of a fire, the circuit is closed by the heat evolved and the bell caused to ring. The cover of the bell box, *f*, is connected with the bell in such a manner that when the armature vibrates



the box cover is allowed to fall. The box cover is connected by means of a flexible cord, *d*, with the telephone receiver, *c*. When the box cover drops the receiver is jerked off the hook. This signals the central office, and the operator, upon plugging in, hears the vibrating bell ringing and informs the fire department.

HE DOESN'T NEED A TELEPHONE DIRECTORY.

GEORGE HEBBLE, a blind organist and music teacher, of Indianapolis, Ind., has a remarkable memory. Part of his work is to memorize the names and telephone calls of over two thousand one hundred of his friends, subscribers of both the Indianapolis and Bell companies. "I could easily commit the whole of both companies' directories if it were necessary," he said. "Often when I am unable to go to sleep at night I lie in bed and classify these telephone numbers and addresses until I get to sleep. Other people count sheep for the same purpose, but my telephone calls always bring the desired result for me. I have never been able to get very far above 2,100 of the telephone calls as I always go to sleep, and so I do not know exactly how many calls I have in my memory."



FINANCIAL

ATKINSON, ILL.—The Henry County Telephone Company of Atkinson has increased its capital stock from \$2,500 to \$15,000.

PEKIN, ILL.—The Citizens Telephone Company has increased its capital stock from \$10,000 to \$75,000.

BALTIMORE, MD.—The Hughes Telephone Mfg. Company, of Hanover street, has issued \$50,000 of bonds for the purpose of developing its plant.

KANSAS CITY, MO.—The Western Independent Telephone Company, of Kansas City, has increased its capital stock from \$21,000 to \$1,479,000.

NEW BARNSTED, N. H.—The Union Telephone Company, of New Barnsted, has increased its capital stock to \$1,500.

KIMBALL, S. D.—The Kimball Telephone Company has declared a dividend of 2 per cent. for seven months, after deducting \$355 for improvements. The company has fifty-eight telephones.

WOONSOCKET, S. D.—The Woonsocket Telephone Company has declared a dividend of 12 per cent. for six months, after paying running expenses of \$450. The company has 138 telephones in service.

FRANCHISES

BAKERSFIELD, CAL.—The supervisors have granted a franchise for a telephone line from Wasco to Faso Robles. The line will be owned and operated by the Overland Auto Traction Company, a local corporation.

SAN GABRIEL, CAL.—D. E. Juvenal has applied for a franchise to operate telephone and telegraph systems east of San Gabriel.

EVANSTON, ILL.—The Osborne McMullen Telephone Company has submitted an ordinance to the City Council granting the company a franchise to operate here.

OWATONNA, MINN.—The Tri-State Telephone & Telegraph Company has presented to the District Court a petition asking that the Court issue a writ of mandamus against the Common Council to compel the law to pass an ordinance granting the company a franchise. The petition states that the reasons advanced by the Council for refusing a franchise are only pretended reasons, and that it is endeavoring to keep the Tri-State Company out for the benefit of the Northwestern Telephone Exchange Company. It further states that the Council is abusing its police law privileges in the matter.

CAMDEN, N. J.—Heber C. Robinson, representing the Eastern Telephone and Telegraph Company of Camden, has applied to the Wild Wood Borough Council for a franchise.

PERTH AMBOY, N. J.—The Borough Council has granted a franchise to the Central New Jersey Telephone Company.

RAHWAY, N. J.—The Clark township committee has passed an ordinance giving permission to the Northeastern Telephone & Telegraph Company to construct lines on the highways in Clark township.

COMBINATIONS

FAYETTE, MO.—M. B. Yeaman, editor of the Howard County *Advertiser*, has purchased C. E. Betts' interest in the Fayette Telephone Company and will become manager on January 1st.

ELECTIONS

LAPORT CITY, IA.—The Laport City Telephone Company has elected the following officers: James Gardinar, president; H. H. Brownelle, vice-president; P. L. Ferguson, director.

LEMARS, IOWA.—The Lemars Telephone Company has elected the following officers: A. C. Colledge, president; F. A. Post, vice-president; I. S. Mahan, secretary and treasurer; J. N. Sammis, general counsel. The company has increased its capital stock to \$50,000.

MERINGUE, IA.—The Iowa County Mutual Telephone Company has elected the following officers: J. N. Shedenhelm, president; William Bair, vice-president and secretary; A. A. McGiverin, J. B. Betz, and Henry Kopping, directors.

OBERLIN, KANSAS.—The Central States Telephone Company, of Oberlin, has elected the following officers: A. C. T. Geiger, president; S. J. Morish, vice-president; C. Borin, secretary; J. B. Seaman, treasurer; Joseph H. Young, general manager.

CHARLOTTE, MICH.—The Baton County Telephone Company has elected the following officers: R. H. Bohn, president; Jacob Upright, vice-president; C. E. Chappell, secretary, and E. T. Church, treasurer.

WAYNE, NEB.—The Wayne and Altona Independent Rural Telephone Company has elected the following officers: J. Liveringhouse, president; W. H. Gildersleeve, vice-president; F. Ersleben, secretary, and M. Von Seggern, treasurer.

COOPERSTOWN, N. Y.—The Butternut Valley Telephone Company has elected the following officers: G. Clayton Peck, president; D. I. Laurence, vice-president; Geo. Whitman, secretary; E. E. Carpenter, treasurer. A dividend of 7 per cent. was declared, payable January 1st. To provide for rebuilding and new construction it was decided to issue \$1,200 more of stock.

JAMESTOWN, N. Y.—The Chautauqua Telephone and Telegraph Company has elected the following officers: Thaddeus S. Lane, president; Geo. W. Appleby, vice-president; Frank H. Mott, secretary, and Brewer D. Phillips, treasurer.

NEWARK, OHIO.—The Newark Independent Telephone Company has elected the following officers: Harry Swisher, president; J. C. Brennan, vice-president; C. H. Spencer, secretary; Edward Kibler, treasurer; E. T. Rugg, W. S. Weiant, and J. J. D. Macnamar, directors. The company declared a dividend on common stock and preferred stock.

ELK MOUND, WIS.—The Elk Mound Telephone Company has elected the following officers: J. O. Smith, president; E. C. Jacobs, vice-president, Dr. J. E. McCoy, secretary and treasurer. A 6 per cent. dividend was declared for the five months it has been doing business. Plans were made for future extensions.

ISLAND CREEK, O.—The Island Creek Telephone Company has elected the following directors: W. L. Ford, E. Y. Powell, D. S. Carr, W. E. Abraham, C. W. McCullough, F. C. Shane and J. H. McCullough.

LEOLA, S. D.—The Union Telephone Company has elected the following officers: Martin McLeod, president; F. E. Van Demark, vice-president; E. W. Greatorex, secretary and superintendent.

BRISTOL, WIS.—The Bristol Telephone Company has elected the following officers: Dr. Stephens, president; J. A. Rowbottom, secretary and treasurer.

PLATTEVILLE, WIS.—The stockholders of the Farmers' Telephone Lines held their annual meeting here recently and elected the following new officers: Frank Goodell, president; Norman Adkinson, vice-president; Samuel Poland, secretary, and J. P. Huntington, treasurer.

RATES

LOGANSPOUT, IND.—The Logansport Home Telephone Company has increased its rate for business telephones from \$18 to \$30 per year. The large expenditure for extensions and improvements made it necessary to do so.

PERSONAL

C. C. DUNCAN, manager of the Cumberland Telephone Company at Jackson Tenn., has been made manager of the Henderson, Tenn., exchange.

E. H. LAWSON has resigned as manager of the McKinney, Texas, Telephone Company, and is succeeded by Miss Pauline Hughes, who has been serving as chief operator.

COLUMBUS, OHIO.—The following changes in the management of the Central Union Telephone Company are announced: John H. Ainsworth, of Zanesville, becomes general manager at Columbus, succeeding H. P. Miller. E. A. Reed comes from New York to take the position of division superintendent. A. L. Ipish, of Mansfield, becomes district superintendent, with headquarters at Chillicothe. H. E. Allen, Dayton, will be district superintendent here. F. G. McConnell, Youngstown, is made district superintendent at Akron. He is succeeded at Youngstown by S. S. Houston, of this city. A. J. Mellen, local manager at Toledo, has been made district superintendent at that city.

RAY H. MANSON will be temporarily in charge of the sales department of the Kellogg Switchboard and Supply Company on and after Jan. 1st, in place of Mr. A. E. Barker, resigned.

OBITUARY

IOWA CITY.—Hon. George W. Wagner, aged forty-four, died here recently. He was formerly a member of the legislature of Iowa. He was president of the Johnson County Mutual Telephone Company.

MISCELLANEOUS

INDIANAPOLIS, IND.—The rapid increase of telephones in Indiana is shown by the tax record in the Auditor of States office. Eight years ago there were in the whole State 5,776 telephones, Independent and Bell together. To-day there are 80,000 Independent and 22,000 Bell telephones in use in the State. That means a telephone for every twenty-five men, women and children.

LEBANON, IND.—The Lebanon Telephone Company's plant has been damaged to the extent of \$2,500 and the system temporarily put out of business because of a cable which came in contact with a trolley wire belonging to the Indianapolis and Northwestern Traction Company. Three hundred switchboard drops and 350 telephones were burnt out and two new cables badly damaged.

BOSTON, MASS.—The instrument statement of the American Telephone & Telegraph Company for November with comparative figures is as follows:

November.	1903.	1902.	1901.
Shipments	96,963	93,487	88,497
Returned	32,297	36,838	27,510
Net output	64,666	56,649	60,987
Since Jan. 1.			
Shipments	1,020,941	994,422	867,323
Returned	441,013	420,682	352,173
Net output	579,928	573,740	515,150
Instruments in use.....	3,730,248	3,009,346	2,467,966
The Mexican Telephone Company reports these comparative operations for September and seven months of the fiscal year:			
September.	1903.	1902.	Increase.
Earnings	\$23,024	\$20,907	\$2,117
Expenses	11,099	11,359	*260
Net	\$11,925	\$9,548	\$2,377
Since March 1.			
Earnings	\$158,949	\$130,937	\$19,012
Expenses	80,119	76,805	3,314
Net	\$78,830	\$63,132	\$15,698
Subscribers	4,759	4,302	457
Subscribers	\$22,274	\$20,344	\$1,930

* Decrease.

UNDERGROUND.

WASHINGTON, D. C.—The Chesapeake & Potomac Telephone Company is planning to greatly enlarge its underground conduit system.

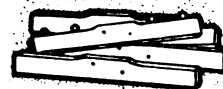
BROOKLINE, MASS.—The New England Telephone and Telegraph Company has been granted permission to lay and maintain underground conduits along certain streets.

ATLANTIC CITY, N. J.—The Atlantic & Delaware Telephone Company has petitioned the city council for permission to construct underground conduits under the Board Walk.

CLEVELAND, O.—The city officials are considering putting police and fire wires underground. They are also discussing the wires belonging to different corporations, which will be placed underground during 1904.



New Construction in the Field



WILMINGTON, DEL.—The Delmarvia Telephone Company is preparing to spend between \$150,000 and \$200,000 the coming year in improving its lines. J. J. Comer, formerly connected with the Maryland Telephone & Telegraph Company, of Baltimore, has been appointed general manager of the Delmarvia Company. David E. Evans has been elected president, and G. R. Webb, of the Maryland Telephone & Telegraph Company, is said to own the controlling interest in the Delmarvia Company. All the wires of the company will be put underground and a new central office plant installed.

MICHIGAN CITY, IND.—The Merchants Mutual Telephone Company will string three miles of new cable early in the spring of 100 lines each. This will give the local company a capacity of 1,200 telephones.

STRATFORD, IA.—The Stratford Independent Telephone Company is planning to commence construction work in this city soon after the first of the year. The company will change its name to the Hamilton County Independent Telephone Company. The capital stock will be \$30,000.

HAVEN, KAN.—Claude Eaton has just constructed an exchange here with fifty subscribers. Mr. Eaton will soon construct another line into the country and other lines thereafter.

WELLINGTON, KAN.—The Farmers Mutual Telephone Company has its line completed from Rome to this city. The company will construct two lines out of South Haven, one to Portland and Ashland and one to Corbin. It is probable a line will also be constructed from Rome to Perth.

BOWLING GREEN, KY.—The Home Telephone Company held a meeting here recently and authorized the building of a line to Scotville.

BENZONIA, MICH.—The Benzie County Telephone Company will make many improvements on its lines the coming year.

CREIGHTON, NEB.—M. C. Theisen, of the Camp Dewey Telephone Company of this town is constructing an exchange at Lynch, Neb.

LOUP CITY, NEB.—W. G. Raish, representing the Central Telephone Company, of Brokenbow, is here for the purpose of constructing the company's lines through the city. It is probable that they will install a local exchange.

LEBANON, N. J.—The Lebanon Telephone Company will extend its line to Teetertown.

HAMILTON, O.—The Home Telephone Company, of Hamilton, has a representative in Trenton soliciting subscribers. The company will construct a line to Trenton if a sufficient number of subscribers are obtained, and will install a local exchange.

MARIETTE, O.—The West Virginia Western Telephone Company, which controls the local plant, is contemplating extensive improvements to be

made in its local property within a few months. New switchboards, cables, telephones, etc., will be installed, and the whole plant remodelled.

SHERODSVILLE, O.—The new exchange of the Crescent Telephone Company is being put into operation. It will start early in the new year with 100 telephones. W. S. Tegget is vice-president.

DALLAS, PA.—The directors of the Centermoreland Telephone Company and the Lake and Lehman Telephone Company held a meeting at Meeker recently, and decided to extend their lines to Dallas, where they will connect with each other. The Farmers Telephone Supply Company, which operates in the territory around Benton, will also connect with these two companies.

CROCKET, TEX.—J. S. Cook, of Crocket, is making arrangements to construct telephone lines from Madisonville to High Prairie, Cottonwood, Millwholc, Hollis, Mecca, Neal and Roger's Prairie.

TRACTION COMPANIES HAVE SUPERIOR RIGHTS TO TELEPHONE COMPANIES IN INDIANA.

JUDGE ARTMAN, of the Boone County, Indiana, Circuit Court, has rendered a decision of great importance to telephone and traction companies, in a case involving the superior rights thereof.

The New Long Distance Telephone company filed a petition to enjoin Townsend, Reed & Co., builders of the Northwestern traction line, from interfering with its wires, which had been established previous to the wires of the trolley company. The court denied the writ and held that when a traction company has to string its trolley wires in a certain way, telephone companies are required to change their wires to conform thereto; that a telephone company cannot enjoin a traction company from thus interfering with its wires. The court, however, held that in case of refusal, the telephone company may recover from the traction company, by a suit at law, the expense incurred by the enforced change of wires to conform to the electric line.

This is the first ruling of any court in this state on the direct question. Similar suits have been filed, but compromised before reaching trial. The telephone company has appealed.

BOOK REVIEWS

Practical Lessons in Electricity, selected from the Electrical Engineering Course of the American School of Correspondence, Armour Institute, Chicago; seventy-four pages, profusely illustrated; price, 70 cents.

One of the most significant signs of the times is the establishment and rapid development to almost astonishing proportions of the correspondence school. This is an institution which enables those for whom a regular college course is impractical, to obtain carefully-edited text-books, particularly designed to cover a wide range of topics, and such assistance by correspondence as will enable the student to become proficient in any or all branches which he may desire. Among the noteworthy institutions of this class is the one established by the Armour Institute in Chicago. For this school a scientific encyclopedia consisting of twenty odd volumes has been prepared under the direction of the highest American experts on each topic. These volumes are supplied to the regular students, and form the chief portion of the curriculum in each branch. With customary Western enterprise the Armour Institute has gone a step beyond the ordinary correspondence school, and is proceeding to compress its correspondence collegiate course into a small space, so that the elementary portions thereof may become available to less advanced students, or those who do not care for the whole. The volume before us is an abstract of the electrical course. As its name indicates, it deals with the elements of electrical science. Commencing with magnetism and static electricity, the more important electrical laws are described and illustrated. Succeeding the principles come the more important applications of electricity, such as the telephone, the telegraph, the dynamo machines, arrangement of batteries, methods of wiring, and rules for light and power circuits. As a rule the explanations given are exceedingly clear. Nevertheless, to compress so much information in so small a volume has necessarily required the most concise language. One of the most valuable features of the volume is the introduction of numerous numerical examples, some of which are worked out in detail and which enable the student to instantly comprehend the method of calculations.

TRADE NOTES

THE STERLING ELECTRIC CO., Lafayette, Ind., has taken a contract for a 1,000 line addition for the Toledo, Ohio, Home Telephone Company. The necessary apparatus is now being installed.

THE KELLOGG SWITCHBOARD AND SUPPLY COMPANY, of Chicago, Ill., announces that, on and after January 1st, Mr. Ray H. Manson will be temporarily in charge of its sales department in place of Mr. A. E. Barker, resigned.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, of Chicago, Ill., has, during the past week, made the following switchboard shipments: Wolsey, S. D., 1—100-line express; Auburn, Neb., 1—540-line express; Pleasant Hill, Mo., 1—200-line express; Salisbury, Mo., 1—100-line express; Espeyville Station, Pa., 1—100-line express; Savannah, Mo., 2—200-line express; Sargent, Neb., 1—100-line express; Yates, Mo., 1—100-line express; Kremlin, Okla., 1—100-line express.

THE TENGWALL FILE & LEDGER COMPANY, Chicago, Ill., sends out a little booklet, called "Conveniences for the Office and Home that Save Time, Temper and Trouble." Besides illustrating and describing loose leaf devices made by the company, it gives several mottoes that appeal to business men. Some of them are here given: "Next to knowing a thing is knowing where to look for it." "He who takes his own time generally takes other people's, too." "Expense of time is the most costly of all expenses." "Best time is present time."

THE MONARCH TELEPHONE MANUFACTURING COMPANY, of Chicago, Ill., announces that it now has its new desk stand ready for sale and can make immediate shipment of all orders. This

stand was shown in the company's exhibit at the Interstate Telephone Convention, and a considerable number of orders secured, notwithstanding the fact that at that time deliveries could not be made for several weeks. This new desk stand and all other Monarch apparatus is fully illustrated and described in an elaborate catalogue which the company has just issued. The booklet will be sent upon application.

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., has sent us a booklet describing a new design of switchboard which this firm has just placed upon the market. It is called The Lamp Signal Magneto Board. The endeavor of the Sterling company has been to design a switchboard in which the old fashioned drops could be replaced by a relay and lamp, and yet which could be operated in conjunction with magneto lines without requiring any further alteration of the system. Doubtless such a board will be attractive to many customers and would make a decided advance in the operation of magneto lines. The catalogue in question illustrates the various sizes and types of boards manufactured, and furnishes detailed descriptions of both the lamp and line jacks, keys, plugs, relays, and other pieces of apparatus. We recommend central station managers who are interested in this development to write the Sterling company for a copy of this periodical, which will be gladly furnished upon application.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—Four sections of American Express Light Transfer Switchboard. Is practically good as new. Was in use fourteen months when replaced with central energy. CONNERSVILLE TELEPHONE CO., Connersville, Ind. 118.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOU USE THEM EVERY DAY.—Toll Tickets for Independent Companies. Five thousand, 3 colors, prepaid, \$2.50, cash with order. THE AMERICAN TELEPHONE JOURNAL knows we are O. K. Write for samples; also figures on large quantities. GILDART BROS., Albion, Mich. 112

WANTED.—A bright young man with a good technical education in electricity to test cables for insulation resistance, capacity, and locating trouble. No application considered unless stating age and salary expected. Address Box 119, care of THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 119.

POSITION.—A first-class construction man with thirteen (13) years' experience in telephone (both Independent and Bell) and electric light work, desires connection with a telephone company in its construction department. Address, Box 99, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 99.

WANTED.—Position by a first-class construction and troubleman. Ten years' experience in factory and exchange work. Sober, reliable, best of references. Address Box 117, care of THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 117.

INVESTOR wanted to furnish necessary capital for developing good paying telephone property to be managed by an experienced telephone engineer. Will accept nominal salary and equity in plants for services. Address Box 73, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 73

"TOO COLD TO PLANT POLES."

Possibly, but wouldn't it be a good idea to have them on the ground, ready to use?

There's nothing handier than a carload of assorted sizes, ready to draw on in case of a Sleet Storm. We have all sizes of top from 4 to 8 inches in the various lengths.

Let us hear from you.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Empire Building.**

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

Idaho Cedar Poles

LONG LENGTHS A SPECIALTY

Large
Stocks

Yards

IDAHO
MONTANA

Low
Prices

We also handle MICHIGAN CEDAR POLES

Write for prices.

The Western Lumber & Pole Co.

Main Office, Iron Building, DENVER, COLO.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.

SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.

MENOMINEE, MICH.

M
I
C
H
I
G
A
N

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

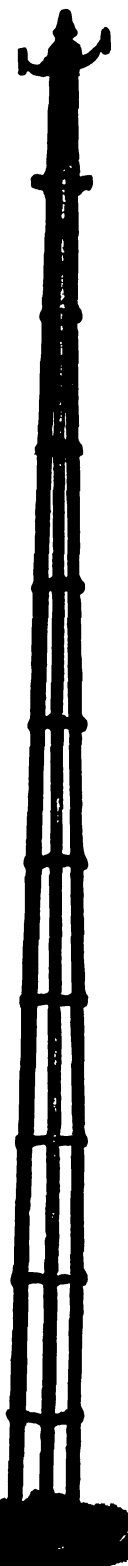
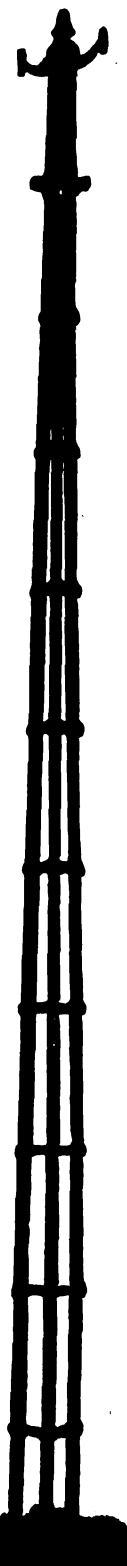
Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

- 
- 
- 1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.*
- 2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.*
- 3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.*
- 4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.*
- 5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.*
- 6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.*

AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."

PRODUCERS NOT JOBBERS CEDAR POLES

LOWEST PRICES
IN CARLOAD LOTS

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 S. GREEN ST.

CHICAGO.

Cedar Poles

Large Stock

Prompt Ship-

ment.

LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

ADVERTISERS' DIRECTORY—Continued.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

MAGNET STEEL.

Leslie, A. C., & Co., Montreal,
Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co.,
Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Eccleston Lumber Co., New York.

Nagel, W. G., Electric Co., To-
ledo, O.

PLATINUM.
Croselmire & Ackor, Newark,
N. J.

POLES.

Bissell Co., The F., Toledo, O.
Beidler, Francis, & Co., Chicago,
Ill.
Eccleston Lumber Co., New York.
Franklin Rolling Mill and Foundry
Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee,
Mich.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Lindaley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City,
Mich.
Michigan Cedar Co., Bay City,
Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast Pole Co., Spokane,
Wash.
Pittsburg & Lake Superior Iron
Co., Escanaba, Mich.

Sterling, W. C., & Son, Monroe,
Mich.

Townsend Cedar & Supply Co.,
Chicago, Ill.
Valentine-Clark Co., Chicago, Ill.
Western Lumber & Pole Co.,
Denver, Colo.
Wisconsin Timber & Land Co.,
Mattoon, Wis.
Worcester, C. H., Co., Chicago,
Ill.

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brook-
line, Mass.

PROTECTORS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., To-

ledo, O.

SEALS.
Middleton & Co., J. W., Chicago,
Ill.

SIGNS.
Ingram-Richardson Mfg. Co.,
Beaver Falls, Pa.

SOLDER, RESIN CORE.
Kellogg Switchboard & Supply
Co., Chicago, Ill.

STATIONERY.
Telephone Printing Co., Defiance,
Ohio.
Tengwall File & Ledger Co., Chi-
cago, Ill.

STEEL.
Leslie, A. C., & Co., Montreal,
Can.

Bart, W. J., Mfg. Co., Cleveland,
Ohio.

STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago,
Ill.

SWITCHBOARDS.
American Electric Tel. Co., Chi-
cago, Ill.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

TIES

YELLOW PINE STOCK,
100,000 6" x 8" x 8 FEET.
Chestnut and Oak, large
stock, standard sizes.

Manufactured by

EGCLESTON LUMBER CO.,

29 Broadway, NEW YORK.

POLES

(Southern White Cedar) long
leaf Yellow Pine, octagonal
and square, Chestnut and
Cypress.

**YELLOW PINE CROSS ARMS,
PINS AND BRACKETS.**

Prompt deliveries from stock, New York
city yard, or direct from mills.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality . . .

The Morse
Cedar
Co.

**CEDAR POLES
RAILWAY TIES
SHINGLES, Etc.**

Saginaw,
Mich.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE • CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS

87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ♡ ♡ ♡ ♡

74 CORTLANDT STREET,

NEW YORK CITY

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.



J. W. Middleton & Co.

PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♡ ♡ ♡

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

Tell the Advertiser you saw his
announcement in

**The American
Telephone Journal.**

PLATINUM

SHEET and WIRE for all purposes and all shapes in any quantity.

Special Rates for Refining and Reworking Platinum or anything that contains Platinum. Highest Prices Paid for Scrap Platinum.

CROSELMIRE & ACKOR,

Manufacturers and Importers of Platinum of all kinds.
Factory and Main Office, NEWARK, N. J., 42 Walnut St. N. Y. OFFICE, 10 E. 23d St., Room 8.

An Awkward Thing



to make in the usual way. The usual way isn't the right way, anyway. The right way is the "Die Cast" way. In the "Die Cast" way, the piece comes out of the mold ready for assembling. No machining, no fitting; it's all finished, is cast finished, and things done this way cost less.

Book?

Franklin Mfg. Co.,

202 S. GEDDES STREET,
Syracuse, N. Y. U. S. A.

Do you always mention the

American Telephone Journal

*when writing to advertisers.
It will be appreciated by all concerned if you do.*

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

ELECTRICAL ENGINEER
AND CONTRACTOR :: ::

Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO. CAPITAL. \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltameters,
Milliammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

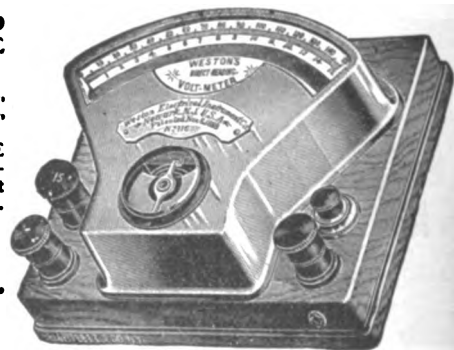
Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



The Standard for Rubber Insulation

Okonite Wires, Okonite Tape,
THE OKONITE CO., Ltd.

WILLARD L. CANDLER, {
H. DURANT CHEEVER, } Managers

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

Manson Tape, Candee Weather-Proof Wire

SOLE MANUFACTURERS

283 BROADWAY, NEW YORK

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

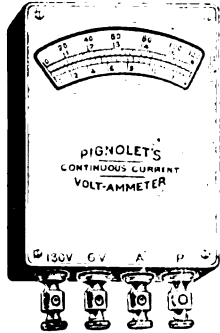
AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.



LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street New York City

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK** ❖ ❖ ❖

Estimates given on Metal Telephone Parts or Special Articles of Brass, Copper, German Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

1900 DRY BATTERY



has stood the test of time, is used by the important telephone companies and is regarded as the standard dry battery in which is embodied all the points that make up the "perfect" telephone battery.

Endurance, high E. M. F. maintained and uniformity guaranteed to the user, service of highest commercial value.

Prices are comparatively lower than others. Correspondence solicited.

ELECTRIC APPLIANCE COMPANY, CHICAGO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Digitized by Google

Important THERE WILL BE SOLD UNDER THIS SPECIAL OFFER A Limited Number Only

of Specifications for Building and Operating Exchanges and Toll Lines with description and dimensions of material required. The following **Set of Specifications—\$2.00—delivered.** Regular price, \$5.00.

SINGLE COPIES

Specifications for Installing Telephones and Inside Wiring,	\$1.00—Special Offer \$0.25
Building Pole Lines for Local Construction,	2.50— " " .50
Wiring and Equipping Cable Poles,	1.00— " " .25
Making Cable Splices,	1.00— " " .25
Making Cable Terminals by Pot Head Splices	1.00— " " .25
Cable Box and Cable Box Fitting,	1.00— " " .25
Making Connection from Pole to Subscriber's Station,	1.00— " " .25
Equipping Poles and Placing Crossarms,	1.00— " " .25
Guying Pole Lines in Cities or Towns,	1.00— " " .25
Building Toll Lines	2.50— " " .50

The above Specifications contain a detailed description covering the **Construction of Telephone Exchanges and Toll Lines** as well as a **Description and Dimensions of Material Required.**

(CASH MUST ACCOMPANY ALL ORDERS)

Combination Subscription Offer

A complete set of the specifications (\$2.00) and a year's subscription to THE AMERICAN TELEPHONE JOURNAL, 52 weekly numbers (\$1.00) can be had for a limited time for \$2.50.

AMERICAN TELEPHONE JOURNAL, 116 Nassau Street, New York City.

Enclosed find \$..... for which please forward those specifications marked "1" at the special price.

(State here if combination subscription order is wanted).....


Name in Full.....

Street and No.....

Town.....

State.....

1903



California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.
THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.
THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.
 W. B. KNISKERN,
 Passenger Traffic Manager,
 Chicago.



THE
ALTON'S
1904
COW-BOY
GIRL

TRADE-MARK.

"Sequel to the Fencing Girl."

Copyright, 1903, by
Chicago & Alton
Railway.

ART CALENDAR

Four graceful poses from life; figures ten inches high, reproduced in colors by a process far superior to last year's calendar. Highest example of lithographic art.

"THE ONLY WAY"

to own one of these beautiful calendars is to send twenty-five cents with name of publication in which you read this advertisement, to GEO. J. CHARLTON, Gen'l Passenger Agent, Chicago & Alton Railway, CHICAGO, ILL.
 The best railway line between CHICAGO, ST. LOUIS, KANSAS CITY and PEORIA. Take the "Alton" to the St. Louis World's Fair, 1904.

To Uppor Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,

CHICAGO, ILL.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work
Wire Rope and Wire Strand
IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Insulated
Electrical
Wires and Cables

R. DEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

SUBSCRIPTION BLANK

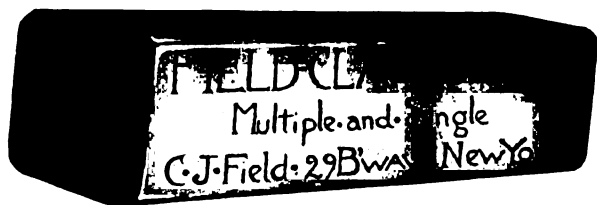
Out this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....



*Large Factories in East and West.
Moderate Prices. Prompt Deliveries.*

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY
Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS AND TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Concluded.

Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Conn. Tel. & Electric Co., Meriden, Conn.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Elect. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Electric Appliance Co., Chicago, Ill.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE HOLDER.

Chicago Writing Machine Co.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Electric Appliance Co., Chicago, Ill.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Croselmore & Ackor, Newark, N. J.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co.,

The Question of the Year

How to prevent
the action of

ELECTROLYSIS

The problem that confronts every
engineer and electrician.

USE

BITUMINIZED FIBER CONDUIT

The **ONLY** conduit sold with a guarantee.
It is water, electrolysis and gas proof.

*The safeguard in the construction of underground electric light power,
telegraph, telephone and street railway systems.*

ARE YOU PROTECTED ?

Send for illustrated booklet.

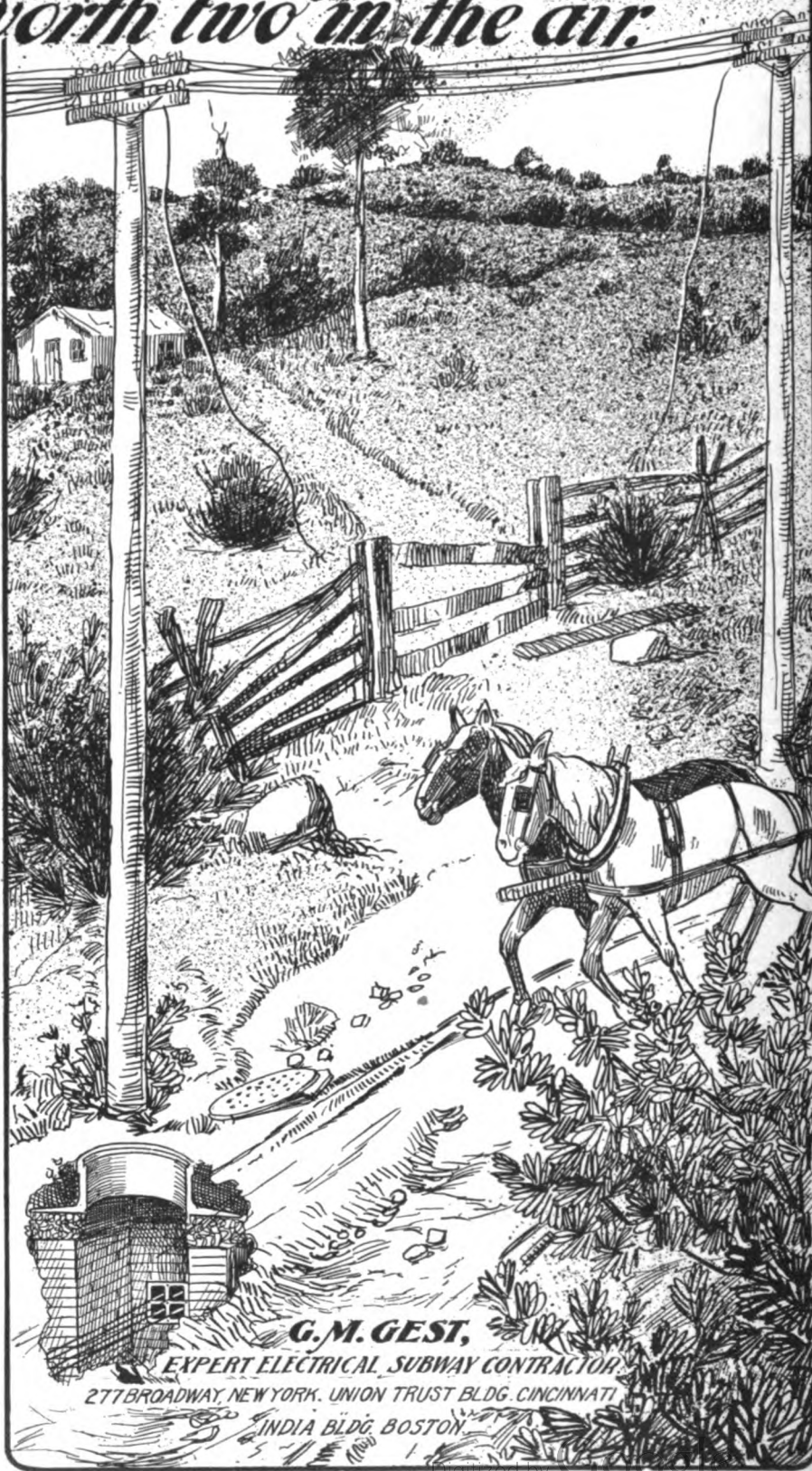
American Conduit Company

170 Broadway,
NEW YORK.

822 Manhattan Building,
CHICAGO.

336 Macy Street,
LOS ANGELES.

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,
EXPERT ELECTRICAL SUBWAY CONTRACTOR
277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI
INDIA BLDG. BOSTON

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT CO.

170 Broadway
NEW YORK

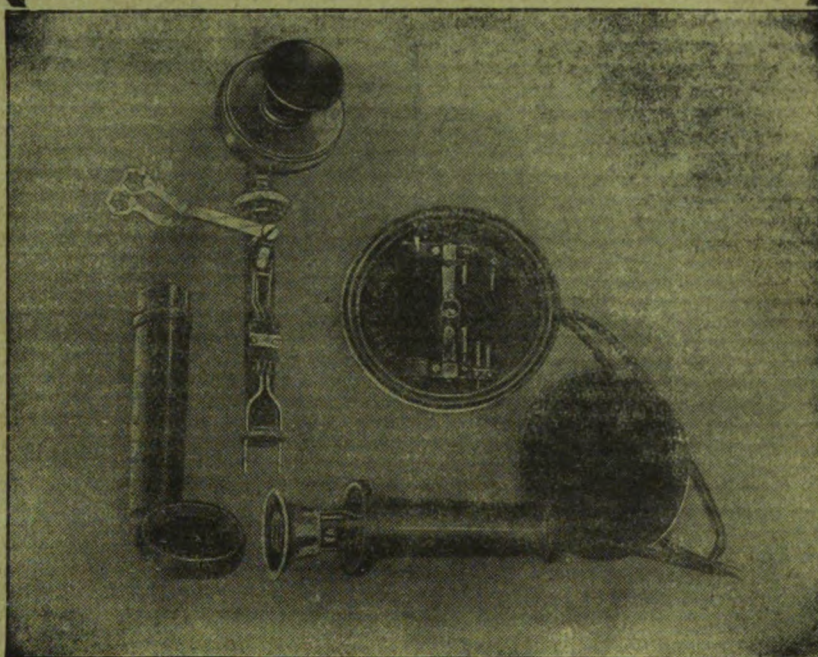
The AMERICAN TELEPHONE JOURNAL

BUY IT NOW

Equipped With
AMERICAN BEAUTY
TRANSMITTER



HERE
IT
IS



THE
ONLY
ONE

NO. 4351, DESK STAND.

BELL
STYLE
RECEIVER



A
PATENTED
ARTICLE

AMERICAN ELECTRIC TELEPHONE CO.

36-58 West Jackson Blvd.,

CHICAGO, ILL.

THE AMERICAN TELEPHONE JOURNAL

JUST A WORD

About our *Convention Number*

We wish to congratulate you on your Convention Number (Dec. 5, 1903). The articles on "Receiver Design," "Home-made Ohmmeter" and "Machine Made Cables" are worth a dollar each.

W. H. FOWLER,
Proprietor and Manager,
Fowler Telephone Co.,
Pella, Iowa.



The editor wishes to thank the subscribers and contributors and all who have helped to the splendid success of "The American Telephone Journal" during the past year. He also wishes to assure readers of this paper that it will be ten times as good this year as last.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—JANUARY 9, 1904—CHICAGO Number 2

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

TELEPHONE BOOTHS AS DIVIDEND PAYERS.....By H. B. Van Sickle.
TELEPHONE EXCHANGE ENGINEERING—Article X.....By Ray H. Manson, Albion D. T. Libby and Chas. A. Simpson.
A HOWLER CALL CIRCUIT.....By Frederick A. Wegner.

SWISS TELEPHONE STATISTICS.

The Operating Field:

IOWA INDEPENDENTS TO HAVE CLEARING HOUSE.
TRANS-MISSOURI ASSOCIATIONS' MEETING.
ANOTHER SLACK CUTTING APPLIANCE.
POPULARITY OF INDEPENDENT SYSTEM.
CENTRAL UNION DISTRICTS INDIANA.

TO THE ST. LOUIS FAIR EXHIBIT.
INDEPENDENTS IN NEW YORK'S SUBURBS.
CANADIAN INDEPENDENTS.
SOLICITING BY TELEPHONE.
PLATTSBURGH, N. Y. INSTALLATION BEGUN.

CHILDHOOD'S UNDERSTANDING OF THE TELEPHONE.

THE TELEPHONE IN THE COURTS.

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 32.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State St. New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

250 LAKE STREET

CHICAGO, ILL.

What a rustling rustle this "turning over of a new leaf" would make if carried to actual practice, yet this week we have all said that we would do better this year. The desire is to do better.

On the battery proposition we all want to do better this year. Last year was the most successful "1900" dry battery year, and we know that the same method of maintaining the highest standard, together with the most approved and up to date machinery, and the policy of a "uniform product or none," will make even a better year than last, not only for us, but the great battery-using public.

We carry a large stock of "1900" dry batteries in Chicago, are marking immediate shipments and are quoting attractive prices.

ELECTRIC APPLIANCE COMPANY, CHICAGO

COOK PROTECTORS STANDARD



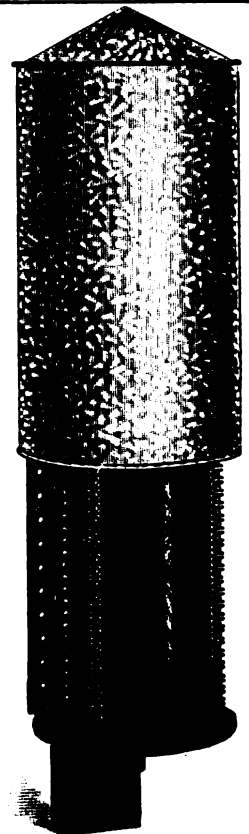
Type H. — Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1880; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

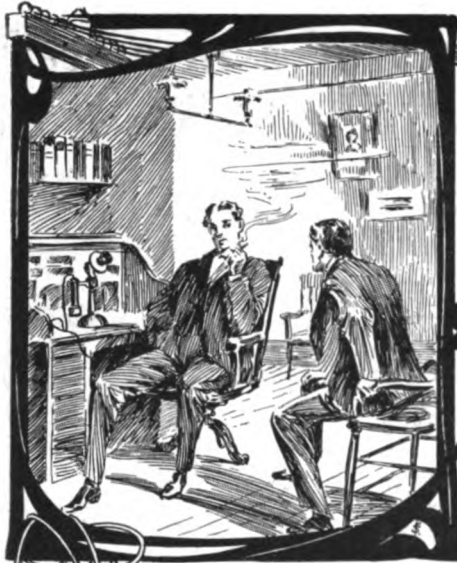
FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1880; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.



INCREASE YOUR INCOME

BY INSTALLING
**STROMBERG-
CARLSON**



Intercommunicating Systems

IN COMMERCIAL HOUSES, FACTORIES, Etc., with Trunk Lines to Your Exchange.

The Twin City Tel. Co., Minneapolis, Minn., Rochester Tel. Co., Rochester, N. Y., Independent Tel. Co., Seattle, Wash., and many others have installed over 100 of these systems in their respective cities. If it pays the larger companies why not the smaller ones in the cities of say 3000 inhabitants and upwards?

WE ARE THE PIONEERS IN THE MANUFACTURE OF THIS TYPE OF APPARATUS.

A cheap telephone is about the most extravagant thing ever installed in a factory. There are telephones being sold for this work that are nothing more than toys.

We manufacture our own instruments from the raw materials. We use the same grade of transmitters and receivers as on our regular telephones. This makes the cost of maintenance almost nothing.

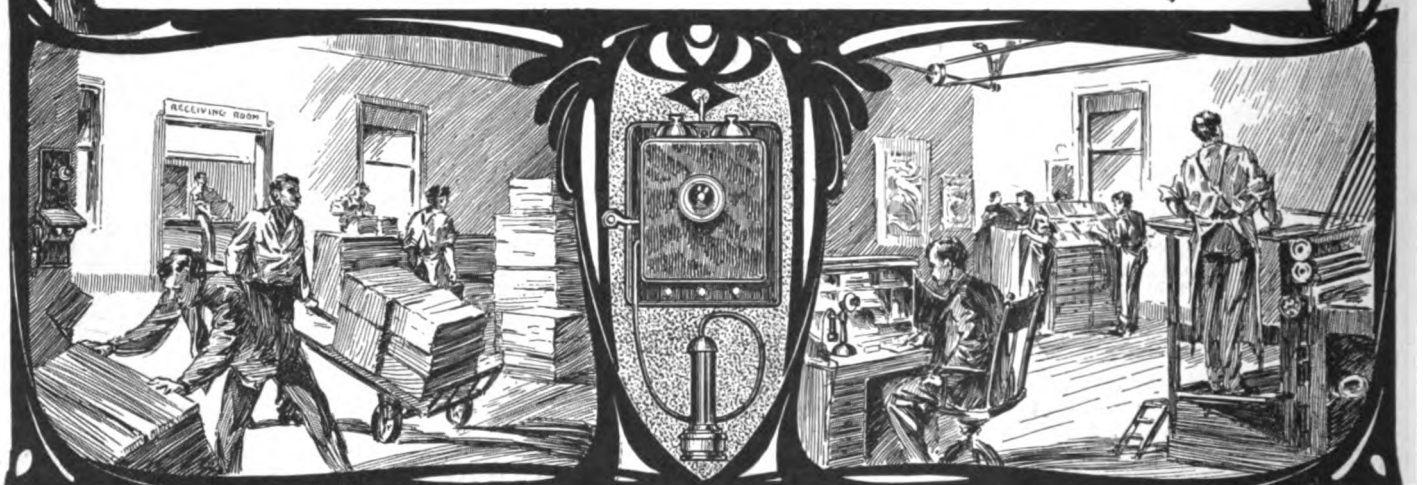
The illustrations show our standard wall and desk type instruments. We can furnish microtelephones instead of desk sets if desired. Write for Booklet 25-B.



**STROMBERG-
CARLSON
TEL. MFG. CO.**

Gen'l & Eastern Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.



"DROPPED FROM ABOVE"

BEARING THIS DESIGN



THE PENDENT TELEPHONE

*IS NEVER OUT OF REACH
BUT NEVER IN THE WAY*

Suspended from ceiling battery by a faultless adjustable hanger it can be moved without effort down, up or in any direction. The mere act of lowering it for use signals Central.

WRITE FOR DESCRIPTIVE MATTER

The Vought-Berger Company

Telephones, Switchboards and Appliances

LACROSSE, WISCONSIN

All Right for Quality

Well Balanced Equipment

**TELEPHONES
THAT NEVER
WEAR OUT**

TRY ME

WRITE
TO-DAY

**THE
NORTH
ELECTRIC
CO.**

CLEVELAND,
OHIO, U. S. A.

156 St. Clair St.

C N 160

No. 12 Telephone for Interior Systems

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

*Send us a
trial order*

Don't fail to send for bulletin 6, describing No. 12 Telephone.

We make a lot of good things.

Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

S. H. COUCH CO.

162 Pearl St. - BOSTON, MASS.

"INTERNATIONAL" Telephones and Switchboards

Should be given due consideration before you place orders for

1904

The new type

Mechanical Self-Restoring Drop Board

A PERFECT APPARATUS

Sample parts, descriptive matter and quotations on request.

**International Telephone
Manufacturing Company**

CHICAGO, ILLINOIS



NEW



A LAMP SIGNAL BOARD FOR MAGNETO WORK

Signals Automatically restored, Lamp Supervision upon the Cords, Simple in Construction---A revelation in Switchboards for magneto exchanges. Write for price and description.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

TELEPHONE
INSTRUMENTS



TELEPHONE
SUPPLIES

EXPOSITION STATUARY

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus
Dealers in "Everything Used with Telephones" 909 Market Street, St. Louis, U.S.A.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

RECENT New Apparatus of other manufacturers is conforming more and more to **KELLOGG STANDARD.**

Some manufacturers are entirely remodelling their telephone apparatus into what careful examination shows to be mere imitation of the **KELLOGG STANDARD APPARATUS.**

We are constantly improving and adding attractive features to our standard, but **FUNDAMENTAL CHANGES** in apparatus are only of those manufacturers whose product differs from Kellogg forms and Kellogg successes.

Examine for yourself!

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Green and Congress Streets, Chicago

346 BROADWAY,	...	...	...	NEW YORK.
ELECTRIC BUILDING,	...	...	...	CLEVELAND.
KEYSTONE TELEPHONE BUILDING,				PHILADELPHIA.

The Monarch Desk Stand

**IS UNDOUBTEDLY THE MOST SIMPLE
DESK INSTRUMENT YET PRODUCED.**



The hook switch is mounted in the base, and is absolutely reliable in operation. All contacts are placed in plain sight by the removal of the sheet iron bottom.

A Monarch Transmitter and Receiver

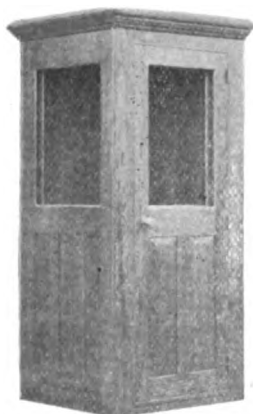
insure a good talking circuit for either Central Energy or Local Battery systems.

For full description of this new stand and all other Monarch apparatus, see our new Catalogue, which will be sent upon application.

MONARCH TELEPHONE MFG. CO.,

14 South Clinton Street,

CHICAGO, ILLINOIS



Booths Pay 80 % Profit

Figures carefully compiled by our customers show this.

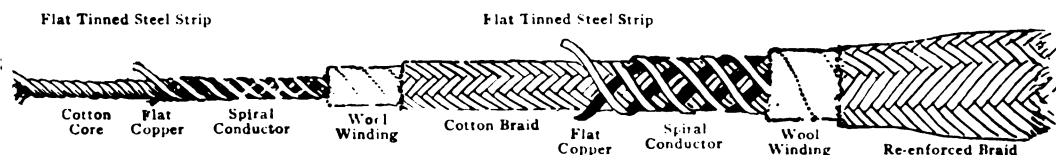
How foolish then not to have 'em, when they **BEAT ANY INVESTMENT ON EARTH.**

Write us and get detailed figures and catalogues.

YESBERA MFG. CO.,

**THE WORLD'S LEADERS IN TELEPHONE BOOTHS
TOLEDO, OHIO.**

Telephone Exchange Switchboard Cords



Knowing the necessity for, and the scarcity of, good cords for this work, we have designed and are making a cord which has stood the test and is giving excellent satisfaction. We make this in two or three conductor, with tips attached. The re-enforcement is 12 inches long. Special lengths furnished if desired at special prices. In ordering these cords please send a sample of the plugs they are to fit.

Bulletin 202, illustrating and describing switchboard cord, and 61 kinds of wire, sent prepaid on request.

THE F. BISSELL COMPANY.
TOLEDO, O.

"READY" TELEPHONE MEMORANDUM PAD HOLDERS



Style No. 1

Patent Pending

Can be furnished to fasten on telephone or on the wall as shown in illustration. Adjustable to any angle, each Holder has straight edge for tearing off memorandums.

NET PRICE EACH \$1.00

MANUFACTURED BY

THE W. G. NAGEL ELECTRIC CO., Toledo, O.

ADVERTISERS' DIRECTORY

American Conduit Co. 37	Cunningham Iron Co. 36	Kellogg Switchboard & Supply Co., Toledo, O. 7, 32	Pittsburg Sewer Pipe & Conduit Co. 36
American Electric Tel. Co. 40	Dickey Clay Mfg. Co., W. S. 36	Klein, Mathias & Sons. 33	Roebling's, John A., Sons Co. 35
Am. School of Correspondence. —	Eccleston Lumber Co. 33	Leslie, A. C. & Co. —	Sand Point Cedar Co. 30
American Vitriified Conduit Co. 39	Electric Appliance Co. 3, 10	Lindsay Brothers Co. 30	Scoville Mfg. Co. 2
Automatic Electric Co. 9	Elkin Machine Co. 33	McIntire, C., Co. 36	Standard Underground Cable Co. —
Barr, W. J., Mfg. Co. 12	Fahnestock Transmitter Co. 33	Maltby Lumber Co. 29	Stanton, L. W. 34
Beidler, Francis & Co. 33	Farr Tele. & Const. Supply Co. —	Michigan Cedar Co. 33	Sterling, W. C. & Son. 33
Bissell Co., The F. 8	Field, C. J. 36	Middleton, J. W. & Co. 33	Sterling Electric Co. 6
Butterfield, J. F. 34	Fowler, John H. 32	Miller Anchor Co. —	Stromberg-Carlson Telephone Mfg. Co. 4
Camp, The H. B. Co. 39	Franklin Mfg. Co. 10	Monarch Telephone Mfg. Co. 8	Swedish-American Tel. Co. 12
Central Mfg. Co. —	Franklin Rolling Mill & Fdy. Co. 31	Morse Cedar Co. 33	Telephone Printing Co. 33
Central Telephone & Electric Co. 6	Gest, G. M. 38	Nagel, W. G., Electric Co. 9	Townsend Cedar & Supply Co. 32
Chicago, Milwaukee & St. Paul Ry. 34	Hart & Co. 11	National Wire Corporation. 35	Valentine Clark Co. 30
Chicago & Northwestern Ry. Co. —	Hemingray Glass Co. —	New Haven Novelty Machine Co. 2	Vought-Berger Co. 5
Chicago Writing Machine Co. —	Holtzer-Cabot Electric Co. —	North Electric Co. 5	Wanted, Situations, etc. 32
Cohn & Bock. 33	Huebel, C. J. & Co. 29	Nungesser Electric Battery Co. —	Western Lumber & Pole Co. 30
Columbia Electric Co. 12	Imperial Finance & Cons. Co. 34	Okonite Company 34	Western Electrical Instrument Co. 34
Connecticut Teleph. & Electric Co. —	Ingram-Richardson Mfg. Co. 35	Pacific Coast Pole Co. 30	Wisconsin Timber & Land Co. 33
Cook, Frank B. 3	Index of the Technical Press. 35	Pignolet, L. M. 36	Worcester, C. H., Co. 29
Couch, S. H. Co. 5	Inland Steel Co. 32	Pittsburg & Lake Superior Iron Co. 29	Yesbera Mfg. Co. 8
Craghead Engineering Co. 12	International Telephone Mfg. Co. 5		
Crosclmire & Ackor. 34			
Crumb, W. H. Co. 34			
BATTERIES.	Okonite Co., New York.	CLIMBERS.	McIntire Co., C., Newark, N. J.
Electric Appliance Co., Chicago, Ill.	Roebling's Sons Co., John A., Trenton, N. J.	Klein & Sons, Mathias, Chicago, Ill.	Nagel, W. G., Electric Co., To- ledo, O.
BONDS.	Standard Underground Cable Co., Pittsburg, Pa.	Nagel, W. G., Electric Co., To- ledo, O.	CONSTRUCTION SUPPLIES.
J. W. Middleton & Co., Chicago, Ill.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	CONDUITS.	American Electric Tel. Co., Chi- cago, Ill.
BRASS.	CABLE HANGERS.	American Conduit Co., Chicago, Ill.	Barr, ... J., Mfg. Co., Cleveland, Ohio.
Scoville Mfg. Co., Chicago, Ill.	Bissell Co., The F., Toledo, O.	American Vitriified Conduit Co., New York.	Craghead Engineering Co., Cin- cinnati, O.
BOOKKEEPING.	Cook, Frank B., Chicago, Ill.	Camp Co., The H. B., New York.	Electric Appliance Co., Chicago, Ill.
Tengwall File & Ledger Co., Chi- cago, Ill.	Craghead Engineering Co., Cin- cinnati, O.	Cunningham Iron Co., Boston, Mass.	Farr Tel. & Const. Supply Co., Chicago, Ill.
BOOTHES.	Nagel, W. G., Electric Co., To- ledo, O.	Field, C. J., New York.	Kellogg Switchboard & Supply Co., Chicago, Ill.
Yesbera Mfg. Co., Toledo, O.	Standard Underground Cable Co., Pittsburg, Pa.	Gest, G. M., Cincinnati, O.	Klein & Sons, Mathias, Chicago, Ill.
CABLES.	CABLE SLEEVES.	Nagel, W. G., Electric Co., To- ledo, O.	Leslie, A. C., & Co., Montreal, Can.
American Electric Tel. Co., Chi- cago, Ill.	Nagel, W. G., Electric Co., To- ledo, O.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.	Nagel, W. G., Electric Co., To- ledo, O.
Bissell Co., The F., Toledo, O.	New Haven Novelty Machine Co., New Haven, Conn.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.	CATALOGUES.	CONNECTORS.	
Nagel, W. G., Electric Co., To- ledo, O.	Tengwall File & Ledger Co., Chi- cago, Ill.	Cook, Frank B., Chicago, Ill.	
National Wire Corporation, New Haven, Conn.			

WANT AND FOR SALE ADVERTISEMENTS, PAGE 32.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



If you don't give your subscribers
AUTOMATIC TELEPHONE SERVICE you
don't give them the best.

Write for our catalogue.

Automatic Electric Company, Chicago, U. S. A.

1900 DRY BATTERY



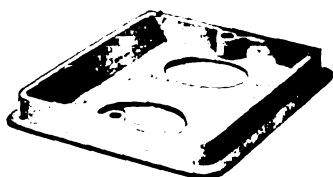
has stood the test of time, is used by the important telephone companies and is regarded as the standard dry battery in which is embodied all the points that make up the "perfect" telephone battery.

Endurance, high E. M. F. maintained and uniformity guaranteed to the user, service of highest commercial value.

Prices are comparatively lower than others. Correspondence solicited.

ELECTRIC APPLIANCE COMPANY, CHICAGO

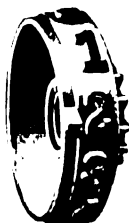
The Things Here Shown Are "Die Cast."



They do not have to be machined in any way. They come from the molds all finished and ready for use. They are sold by us at so much for each piece. You know just what they will cost, and

can regulate your other figures from this cost. The cost is made less than that of rough castings machined.

All details are sent on request.



Franklin Mfg. Company,

202 S. GEDDES ST.,
Syracuse, N. Y., U. S. A.

ADVERTISERS' DIRECTORY—Continued.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scoville Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.
American School of Correspondence, Chicago, Ill.

CORRESPONDENCE SCHOOL.

dence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Creaghead Engineering Co., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Tengwall File & Ledger Co., Chicago, Ill.

FUSES.

Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scoville Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

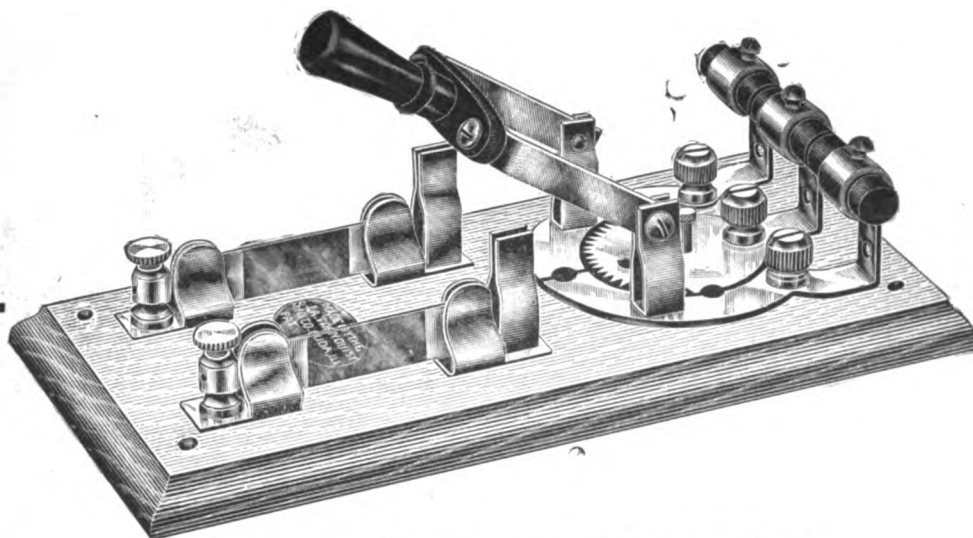
INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingway Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 34.



"TORNQUIST"

Combination Lightning Arrester

**GROUND SWITCH FUSE
AND LEVER CUT-OUT**

KING OF PROTECTORS

**The Best and Safest Protector
on the Market**

Instantaneously Disconnected from Line

**without interfering with other
instruments on same circuit.**

THREE PROTECTORS IN ONE


The only Device of its kind on the market.

HART & CO.
MONADNOCK
BLDG.
CHICAGO

Popular Prices

ORDER SAMPLE NOW

HART & CO.
MONADNOCK
BLDG.
CHICAGO



TURN OVER A NEW LEAF.

1903
RECORD
Trouble

1904
RING OUT
THE OLD-
RING IN
THE NEW

Total trouble cost 3,783.92

MAKE A
RESOLUTION
TO USE
**SWEDISH-
AMERICAN**
APPARATUS
AND YOUR
"TROUBLES"
WILL
VANISH.

SWEDISH-AMERICAN

TELEPHONE COMPANY
CHICAGO

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND

Line Hardware

POLE FITTINGS

**CROSS ARMS, BRACES, BOLTS,
LAGS, WASHERS, PINS, STEPS,
MESSENGER HANGERS, GUY RODS.**

and All Kinds of Telephone Line Construction Material.

SEND SPECIFICATIONS



**The Creaghead Engineering Co.,
CINCINNATI, OHIO.**



WHAT DO YOU THINK!

We can furnish you with a better drop than you have been buying elsewhere, and at a much lower price.

FITS EUREKA BOARD

We manufacture from the raw material, and guarantee every piece we build. We solicit the jobbers' trade and are sure that we can interest you. Write us for anything you may need in the way of switchboard and telephone apparatus. We have more to tell you.

COLUMBIA ELECTRIC CO.

Columbia Self-Restoring Drop.

Mention this paper.

Factory and Office at McCORDSVILLE, IND.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1903 by The American Telephone Journal Co.

Monadnock Building, Chicago.

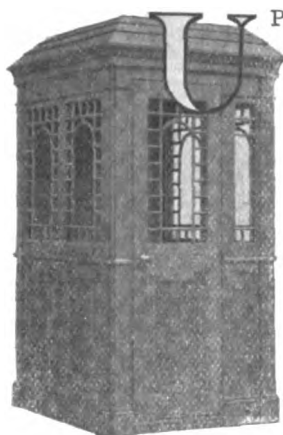
VOLUME IX

SATURDAY, JANUARY 9, 1904

NUMBER 2

TELEPHONE BOOTHS AS DIVIDEND PAYERS.

By H. B. VAN SICKLE.

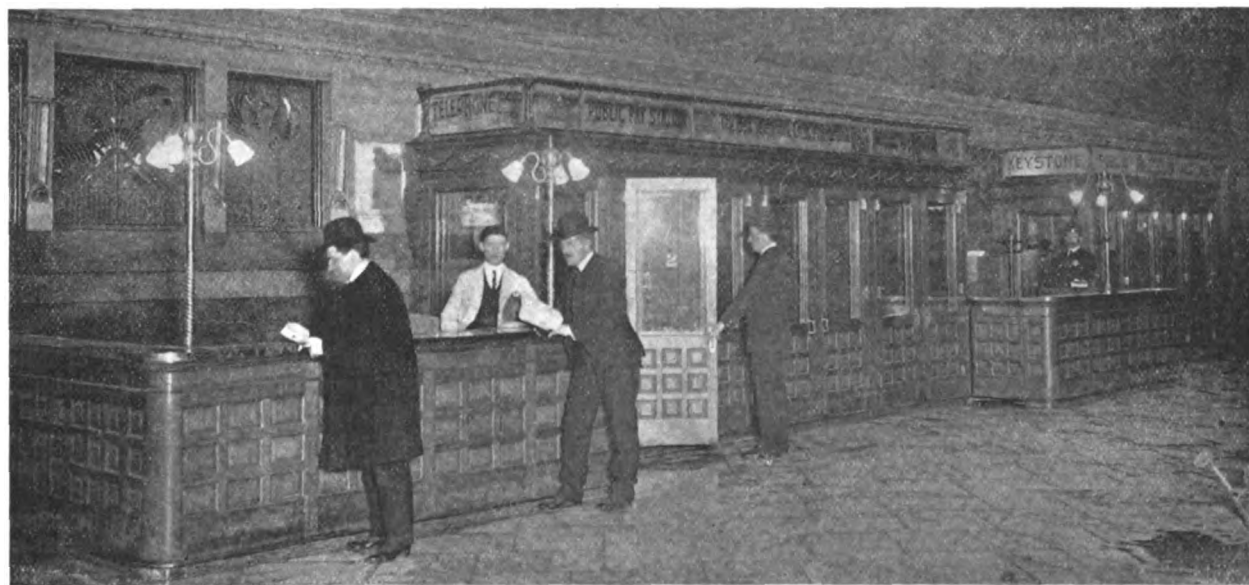


Up to the present time Independent telephone companies have paid but little attention to the use of sound-proof booths as factors in profit making. It is true there has been some activity shown in certain places because of the example set by the Bell companies. This has seemed to influence the Independent managers more than an expectation of the earning power of the booths. The average manager, when questioned as to the advisability of installing sound-proof booths, when the additional expense is taken into consideration, will answer:

"Yes, there is no doubt but that telephone booths would prove profitable if properly handled, but as yet we have not devoted much attention towards developing this field. Our experiments

trucks and wagons, rattling over the cobblestone streets, the hum of street car motors and the clang of their bells, the cries of the newsboys and all the sounds so familiar to dwellers in large cities, make talking in a public place well-nigh impossible. But there is another reason that makes a booth of the greatest value as a dividend payer. This lies in the fact that all, or nearly all, telephone messages are of a strictly private nature. When a man is talking business, and especially if it is of a private or confidential nature, he does not wish all his neighbors or anyone who may happen to be around at the time to overhear his conversation. So careful is he in a great many instances that he will not use the telephone in a public place unless there is a booth. In this way street car companies get many nickels and dimes that rightly should go to the telephone company, and that would, in a short time, pay the added cost of installing a booth.

And when it comes to persons of the opposite sex, they cannot so far overcome their timidity as to use a telephone in a public place, where everyone may hear their conversation, to communicate about a matter of any but the most trivial character. These constitute the reasons why sound-proof booths should be plenti-



Telephone Booths in the Pennsylvania Railroad Station at Philadelphia, Pa.

in most cases show very satisfactory returns, while in others we would like to see better results."

It is the purpose of this article to show that the booth field has large possibilities, and to cause Independent managers to realize that it is a field that can no longer afford to be slighted or dismissed with a remark such as the foregoing. In every town, from the smallest hamlet up to the city of metropolitan proportions, there is a crying need for a "private" public pay station.

The prime reason for the installation of a sound-proof booth is to keep out foreign noises and make conversation easy and pleasant. This is true particularly in large cities, where heavily laden

fully installed in cities and towns and show that there is a demand for their installation. A simple incident came to the writer's attention a short while ago which may help convince the skeptical that booths pay. The scene was a small New England town that had long wanted a telephone service and that finally prevailed on the telephone company to run a line to the village and install a public pay station in the drug, hardware and general all-around store, which also serves as a meeting place of the village characters. The telephone was installed with the provision that unless at the end of the year a certain sum had been received the inhabitants should agree to make up the necessary sum. At the end of

the year about \$15 less than the required sum had been collected from this telephone, and the villagers were obliged to go into their pockets for the additional \$15.

Some one then prevailed on the company to install a booth, not that they dreamed that the revenue of the pay station would be increased, but that it was very distasteful to telephone in such a public place. The booth was installed, and to the great delight of the villagers and surprise of the telephone company, the receipts at the end of the year were in excess of the required sum of \$75. This shows what can be done in a small town, where gossip is particularly rife, and where, from experience, it has been learned that it is better not to talk at all than to talk so anyone beside your correspondent can hear you. Even if the telephone managers would equip their rural lines and pay stations with sound-proof booths, they would find it would bring them a greatly enhanced revenue.

In large cities, as before pointed out, the noise is as much a factor as anything else in keeping people from using public telephones. The writer knew of a particular noisy corner in Toledo where there was a public pay station in the corner drug store. The telephone, which was of the desk type, was usually kept sitting on the counter and all who used it were supposed to pay the proprietor after they had finished. He at last was driven in desperation, by the bother of collecting the money and listening to the complaints of people who said they could not hear, and worse than all, paying for calls charged against him for which he had received no compensation, and told the telephone company that it could either take the pay station away altogether or put in a booth. As it was a good paying station, the telephone company decided on the latter course, and accordingly installed a very handsome model of booth with an automatic coin collecting attachment. This proved to be one of the best investments the company had ever made, for the receipts of this pay station, already large, were doubled and then trebled. The druggist too, was pleased, for he was saved from all sorts of bother in connection with the pay station.

In such places as railway stations, restaurants, steamboat wharves, theatres, hotels, apartment houses, and office buildings, it

has long been known that the telephone company secures a substantial revenue by having pay stations. All these pay stations are largely patronized by people who have business to transact and find the telephone their most efficacious messenger. There is no doubt, however, but that telephone managers made a mistake by not having sound-proof booths in these exposed public locations. The booth will prove a money maker every time if properly handled.

After the booth is once installed it is not a wise proceeding to allow it to take care of itself. It should be nursed and the public educated to its advantages, just as the public has been educated to the use of the telephone itself. In the first place, a very favorable impression is made by having the booths pleasing to the eye in form and finish. Manufacturers of booths are now devoting a great deal of attention to booths of a more or less elaborate nature that harmonize with their environments. Another requisite is that they be absolutely sound-proof, and, at the same time, comfortably fitted up in the interior. A good form is to have a desk on the inside, with a stationary desk set and a small stool on which the talker may sit in comfort.

Judicious advertising will also bring great results when applied to the booth pay station. Scattered through the telephone directory should be announcements of the fact that booths are provided in convenient locations for the use of shoppers, travelers, etc.

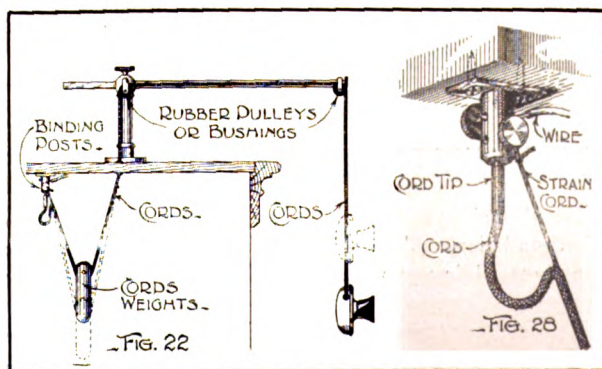
A page of reading matter, placed in a conspicuous location in the directory, telling the advantages of the privacy of the booth, is also an excellent idea. It is well also to have a directory of the pay stations in the back of the regular directory and attention called to it in various parts of the directory. This pay station directory can be so arranged by streets that a person wishing to call up some one, who has not a telephone, may easily find the number of the pay station nearest the home of the one they wish to reach. This article, of course, cannot go very deeply into the details of the matter, but has been written to start the managers thinking in regard to the more general use of sound-proof booths. This is undoubtedly one of the best paying departments of the telephone business if it is properly handled.

TELEPHONE EXCHANGE ENGINEERING

ARTICLE X.—APPARATUS AND MATERIAL

By RAY H. MANSON, ALBION D. T. LIBBY AND CHARLES A. SIMPSON.

THE necessary apparatus to operate the foregoing circuits and the material to be used in the exchange installation will now be taken up in detail and parts to be used in exchange design given reference numbers to facilitate future description.



There are many systems of cataloguing apparatus, but for shop practice it has been found convenient to use a numeral in combination with the name of the article. Thus, No. 1 Transmitter Arm might signify: Transmitter arm for operator's use; suspended transmitter type with counter weights, as per drawing

No. 21. Any change in the details of construction or material used in this arm would necessitate a new code number, and while the code numbers would multiply with successive improvements in apparatus, yet it would not be necessary to refer to a piece of apparatus as old or new model. There might be many new models in the course of development.

Apparatus requiring only a slight modification in its construction to adapt it to different conditions, require a somewhat more complicated system of cataloguing. The switchboard drop or signal is a good example. Differences in mechanical detail of construction would be given numerical code numbers, as in the case just cited, but any change in the winding as regards resistance and kind of wire used, would be designated by a letter of the alphabet. Thus a large type tubular drop used for toll purposes would be designated by a certain number, and for each difference in the winding a new letter would be used in combination.

A No. 2-A Drop might mean: Large type tubular drop; manual restoring; for toll purposes; made as per drawing No. 76; wound to a resistance of 1,000 ohms with No. 31 B. & S. gauge, single silk covered copper wire.

The ideal method of designating changes in winding would be to set apart the different letters of the alphabet for certain resistances. This could not be worked in practice for the num-

ber of resistances required for different types of apparatus exceeds the supply of letters in the alphabet.

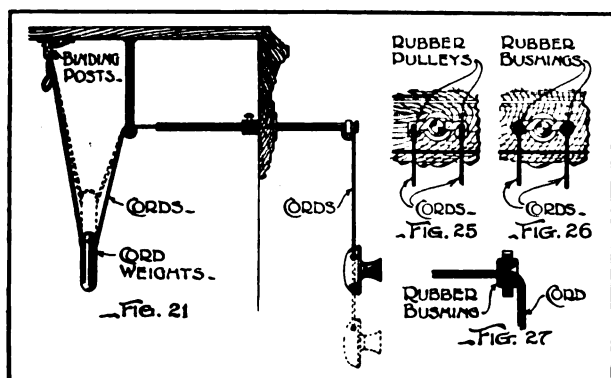
In practice, whenever a new type of apparatus is designed, the first letter of the alphabet is used in combination with the numeral, representing mechanical design, and with each successive demand for new windings of this same design of apparatus letters of the alphabet are assigned in their regular alphabetical order.

TRANSMITTER ARMS.—Transmitter supports can be divided into two general classes: Operator's transmitter arms and subscriber's transmitter arms. The former are usually of such design as to be attached to the top or front of the switchboard or desk cabinet and allow of vertical and horizontal adjustments, which will bring the transmitter into convenient working positions. The latter provide suitable means for attaching the transmitter to the subscriber's station instrument.

OPERATOR'S TRANSMITTER ARMS.—There are three types of operator's transmitter supports:

- (a) Arms for flexibly suspending the transmitter.
- (b) Arms for rigidly supporting the transmitter.
- (c) Breast-plate support holding a special transmitter to be worn by the operator.

FLEXIBLE SUPPORT. (a).—Arms for flexibly supporting the operator's transmitter vary through a wide range in details, but those shown in Figs. 21, 22 and 23 are representative. The first two figures show the transmitter counterbalanced by suitable weights acting through the conducting cords which form part of the transmitter circuit. One of these arms is arranged for mounting in a high type switchboard cabinet, while the other has an upright extension designed to be used on low cabinets and



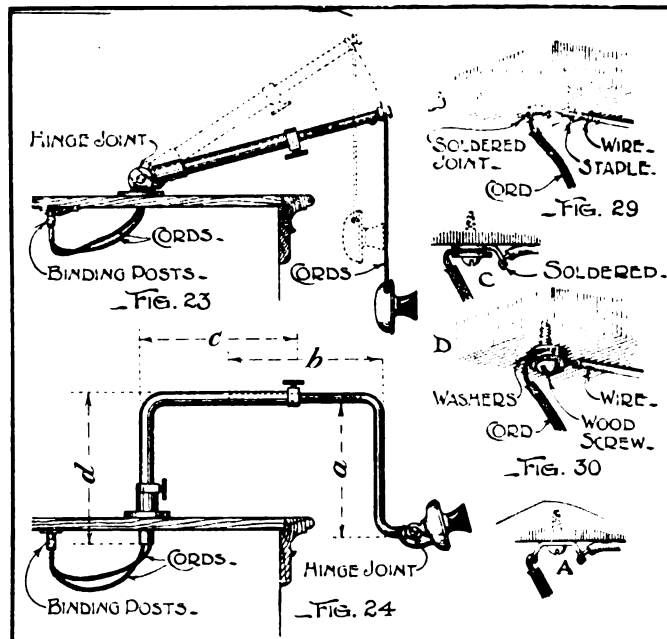
desk switchboards. Both have pulleys for the cords, thus giving free action and preventing unnecessary wear of the conductors and insulation. Instead of pulleys, hard rubber insulating bushings, made similar to Fig. 27, are often used and give very good satisfaction. Properly constructed transmitter arms using a counter-balance admit of quick and easy adjustment for height, without the necessity of set nuts or set screws to lock the same for each change.

For switchboard use, the transmitter must be arranged to conform to the differences in the height of the operators, as well as to the extreme adjustment from seated to standing operators.

Fig. 23 shows an arm suited for desk type switchboards, which has the advantage of a flexible suspension, but does not admit of as ready adjustment as the type just described. Any change in vertical adjustment also causes a change in the horizontal adjustment and brings the transmitter nearer or farther from the switchboard. Thus, in order to keep the transmitter mouthpiece in the same vertical plane as in the counter-balanced type, it becomes necessary to make two hand adjustments and lock the same with set screws or nuts. For desk use it is seldom necessary to change the adjustment of the transmitter after it is once properly set. So the latter arm serves its purpose well. The suspended type transmitter should be of sufficient weight to prevent undue swinging, and so as to quickly come to rest when disturbed. It is also necessary to have the enclosing shell of the transmitter of sufficient solidity with rigid construction so as to prevent the same from vibrating with the voice, as in that

case the transmission will not only be weak, but somewhat "hashed up" due to counter-vibrations.

In order to prevent breakage of the cord conductor through

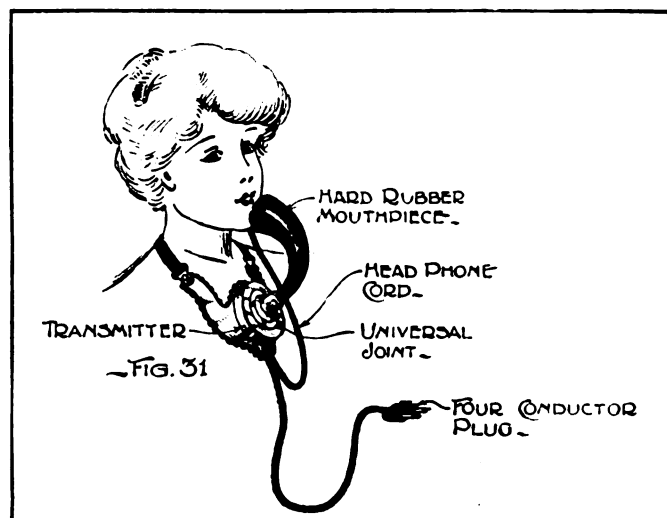


strain, due to the action of the transmitter and counter weights, it has been found necessary to fasten it at both ends by a continuation of the braiding called the "stay or safety cord." Fig. 28 shows a simple way of making this fastening.

SOLID SUPPORT. (b).—The solid type of transmitter arm is usually provided with a vertical and horizontal adjustment and is supported so as to swing in a horizontal plane, thus allowing the transmitter to be moved out of the operator's way when not in use.

Fig. 24 shows the general construction of this type of arm, almost universally used for toll boards and desks where it is necessary for the operator to use both hands for making connections and keeping records. The transmitter supported on this type of arm remains in the position last placed and cannot swing. It is also possible to obtain better transmission with the transmitter solidly mounted, due to the rigid back, which allows the diaphragm to receive the full effect of the sound waves. A cut-out key is usually provided at each toll position, so that the transmitter may be either shunted or cut out when the operator is listening, thus preventing it from introducing noise in the line.

An important point in the construction of switchboards is the



means for attaching the flexible cords to the local wiring. Fig. 28 shows the most reliable connection where flexibility and ease in removal of the cords is desired. This connection employs a

binding post with double binding screws, one for the local switchboard wiring and the other for the transmitter cord tip. This cord tip should be securely soldered to the metal conductor of the cord, the strain, due to the cord weights or from any other source, being taken by the strain cord as previously mentioned.

Fig. 29, A and B, shows soldered connections which provide good electrical contact when made properly, but are objectionable for switchboard use, as they require a soldering iron to remove and replace the cords. Another method, sometimes used, but which should be avoided, is shown in Fig. 30, C and D. The conductors are clamped between washers and the woodwork or other insulating material by screw pressure. It can be readily seen that any swelling and shrinking of the wood will, in a short time, allow the conductors to become loose and make poor electrical contact, also there is liability of stripping the thread in the wood after the screw has been set a few times.

BREAST-PLATE SUPPORT. (c)—The breast-plate transmitter support, a type of which is shown in Fig. 31, provides the most flexible and satisfactory method of holding the switchboard operator's transmitter. The instrument becomes a part of the operator's dress, similar to the head telephone, and keeps the transmitter mouth-piece in the correct position for talking at all times. This method of mounting the operator's transmitter is used almost exclusively in Europe, but met with only partial

Transmitter Arm Code Numbers.

(The following apparatus is to be used in the Exchange Design covered by these articles.)

Code No.	Drawing No.	Description.
1	21	For switchboard operator's use; suspended transmitter type with counter weights; has horizontal adjustment of 12 inches and vertical adjustment of 24 inches; made from solid brass stock with nickel plated finish.
2	24	For toll switchboard and desk operator's use; solid supported transmitter type; has horizontal swing to either side; horizontal adjustment of 8 inches and vertical adjustment of 6 inches; dimensions, a = 8 in., b = 14 in., c = 18 in., and d = 12 in.; arranged for concealed cords; made from tubular brass stock with nickel finish.
3	32	For subscriber's use; long arm with single joint; has a vertical adjustment of 3 inches; length of arm, 6½ inches; arranged for concealed cords; made from sheet steel with japanned finish.
4	33	For subscriber's use; short arm with single joint; has a vertical adjustment of 3 inches; length of arm, 1½ inches; arranged for concealed cords; made from white metal finished casting with oxidized finish.

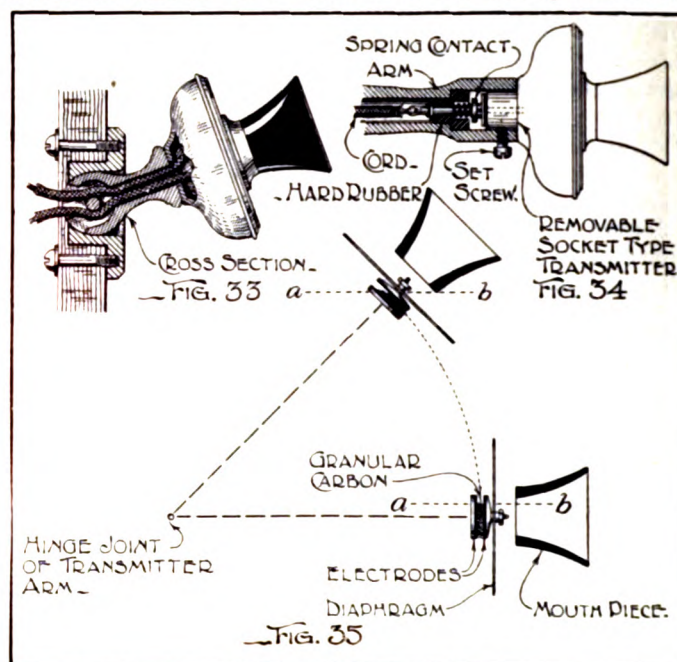
favor in this country. On large multiple switchboards, an instrument of this type is necessary in order to provide the most rapid and efficient service.

With the breast-plate transmitter all of the operators can be provided with individual talking and receiving sets and thus be held personally responsible for their safe-keeping. Nearly all of the metal parts of the breast-plate transmitter and support are made from aluminum and constructed to give the lightest possible combination. In the latest models of these instruments the cord terminals are concealed and the adjustments and parts liable to become loose from regular service are eliminated, thus giving a very reliable as well as efficient type of transmitter support.

SUBSCRIBER'S TRANSMITTER ARMS.—Subscriber's station transmitter arms have gone through a gradual development, and today the designs giving the best satisfaction combine simplicity with strength of parts. One of the most important improvements has been the enclosing of the transmitter cords within the hollow of the arm. Two transmitter cords are used, thus doing away with electrical circuit through the hinge joints in the arm. The long arms are made from punched and formed sheet steel or fine iron castings, both having a japan finish, while the short arms are made from various metals finished in nickel or oxidized.

Long arms are primarily designed to be used on subscriber's sets, where the transmitter is to be mounted above a writing

shelf, the scheme being to have the mouth-piece project a sufficient distance so that the person using the telephone will be required from necessity, rather than inclination, to talk directly into the transmitter. In all cases where the writing shelf is ab-

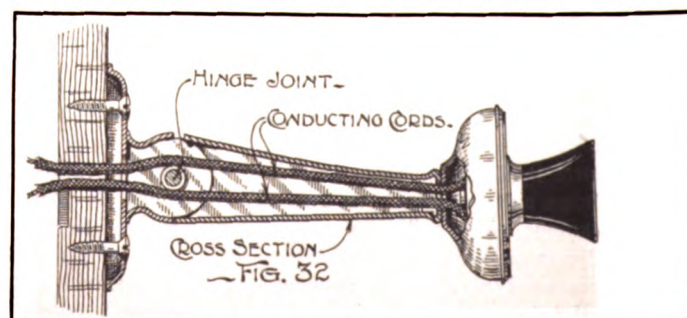


sent, a short arm is preferable, as the instrument is thus made more compact. An example of this latter type of subscriber's instrument can be found in what is known as the hotel or residence telephone.

Figs. 32 and 33 show cross sectional views of the long and short type subscriber's transmitter arms. The location of the two cords forming the transmitter circuit, without including the unreliable hinge contact, are shown extending from the transmitter head through to the rear of the backboard or lid, as the case might be.

Fig. 34 shows one of the many forms of socket connections made so that the transmitter head can be easily removed from the arm by loosening a set screw. In order to be reliable, these socket connections must be carefully constructed and both transmitter cords brought out to the contact springs or screws of the socket or transmitter.

Supports for mounting the "solid-back" type transmitter should have stops arranged so as to prevent too great a movement above and below the horizontal position of the arm. Fig. 35 shows the condition of the transmitter for different positions. It is seen that the granules only cover a portion of the electrode when the instrument is at an angle. Thus a limit is soon reached be-



yond which the resistance of the transmitter will prevent the proper operation of the signal at the central office as well as proper transmission. Double jointed transmitter arms were largely used to overcome this trouble where a wide range in adjustment was desired; the transmitter head thus being easily adjusted and kept in the same vertical plane, provided the subscriber saw fit to make the necessary movement through the second joint. If this was neglected, it would be possible for the transmitter to assume a worse position than with the single joint arm.

A HOWLER CALL CIRCUIT

By FREDERICK A. WEGNER.

AMONG the many useful contrivances that are in use in up-to-date telephone plants, a device which gives a sound known as the Howler Call is worthy of attention. This is, as its name might imply, a device for calling a subscriber to the telephone who has carelessly left his receiver from the hook. Everyone knows that if a receiver be connected in circuit with the battery and the circuit be opened and closed continuously, there will be a continuous hum in the receiver, because every time the

One side of the circuit which it is wished to break goes to this wheel which is of metal and the other side goes to a finger which bears upon the circumference of the wheel as it revolves. Obviously each time a section of the insulation passes from under the finger the circuit is closed and it is again opened when the finger passes to another portion. This interrupter is caused to rotate by power at such a speed as will make the current interruption of such a frequency as to make a loud sound in the receiver. In

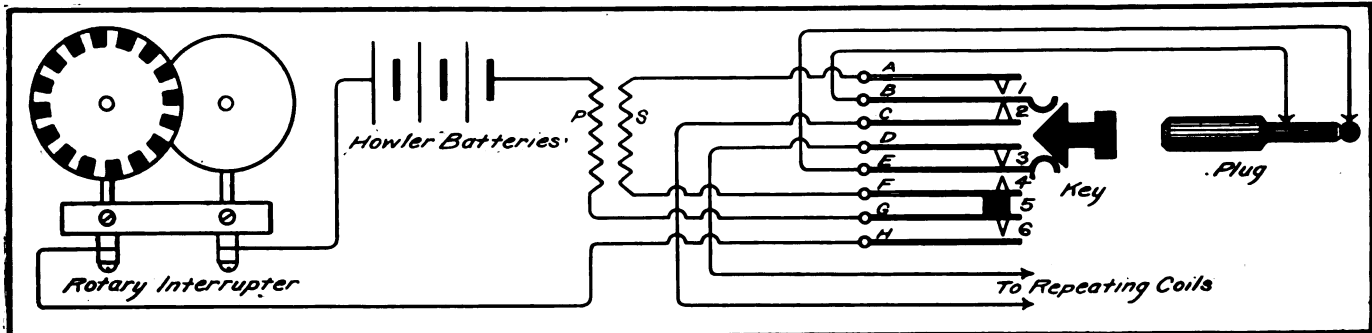


Fig. 1. A Telephone Howler Call Circuit.

circuit is opened, the receiver will click. This is the principle upon which the Howler operates. In practice it is found desirable to use an interrupter, which is usually a mechanical one, in a primary circuit in series with a battery and the primary of an induction coil. The secondary of the coil is connected to the line on which the culprit telephone is located. The induction coil is really a little transformer. Fig. 1 shows a drawing of a "Howler" circuit and the "Howler" circuit key in its normal position. The contacts 4 and 6 are opened, contacts 2 and 3 are closed, the lines c and d connect with a repeating coil, contact 5 is insulated, keeping the springs f and g apart. When it is wished to recall a party to a station where the hand telephone has been left from the hook, the "Howler" plug, shown in the figure, is inserted in the jack of

the larger exchanges this interrupter is usually mounted on the same base with and operated by the same motor that drives the ringing generator. Fig. 2 shows a battery interrupter which can be easily made, and which will give good results. From inspection it is evident that the interrupter works on the principle of an electric bell. At the points h and g two taps are taken off. The wire h leads to the armature side of the bell and the other tap is brought to one end of the bell coil. The other side of the coil is connected to the primary of the induction coil through the battery and back to a binding post, completing the primary circuit to h. The secondary of the coil is brought to the leads a and f, and connected to them as indicated. This arrangement completes the circuit for a simple and cheap current interrupter. A judicious

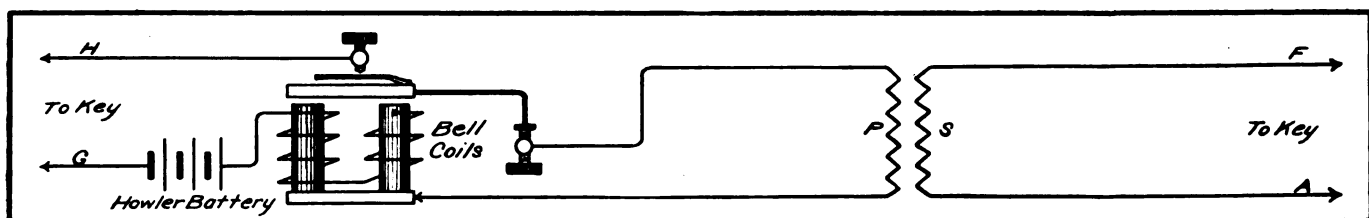


Fig. 2. A Home Made Battery Interrupter.

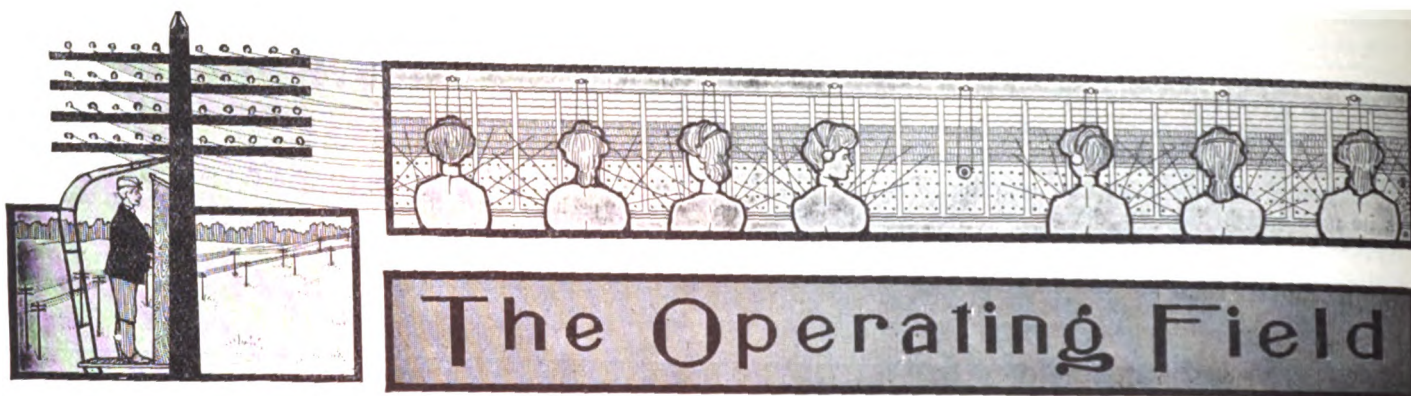
the negligent subscriber and the Howler key is thrown. This breaks the cord circuit and throws the Howler call out on the line of the party who is to be recalled. A double contact or switch on the extreme outside of the key is independent of the key proper and is merely a switch used to close the primary circuit so that battery can flow and operate the Howler only while it is in use. The circular arrangement with the black notches in its circumference shows diagrammatically how a power interrupter is arranged.

use of this device will save many a trip of trouble men, who frequently spend a whole afternoon merely to replace a receiver which some careless one has left from the hook. It will be found that nearly always some one can be brought to the telephone when the Howler is thrown on the line if they are in the same house, as the sound is very penetrating and strange, and anyone who hears it will immediately investigate, and when they reach the instrument will instinctively place the receiver back where it belongs.

INTERURBAN RAILROAD TELEPHONE SYSTEM

THE Northwestern Traction Company, operating seventy-two miles, connecting Indianapolis, Lebanon, Frankfort, Lafayette and numerous intermediate towns in Indiana, put its new long-distance telephone system in operation Jan. 4. It is claimed to be the most elaborate system and conceded to be the most perfect of any in use with the Indiana interurbans. All of the train orders and general business are being transacted by this modern method. The conductor of each train receives

his orders at designated points, registers in, out, and on the way, just as rigidly as the rules require in the operation of a steam road. The train orders are always in triplicate, and no train, or car, can proceed until they are thoroughly understood, and O. K'd. by both motorman and conductor. In addition the company has telephone stations whereby communication can be had instantly with the chief dispatcher, preventing delays in the movements of trains.



IOWA INDEPENDENTS TO HAVE CLEARING HOUSE.

IT was decided, at a conference held recently, of Independent telephone managers representing two-thirds of the mileage in Iowa, to establish a clearing house in Des Moines. All toll line accounts will be turned into it for auditing. The office will make all adjustments, figuring up the proportionate share of tolls. It will probably begin with a manager at a salary of \$1,800 a year and three clerks. The committee will recommend that the division of toll charges under the new telephone clearing house system be on a mileage basis. Each company will receive a share of the toll from messages in proportion to the miles of line used, instead of a percentage as by the present system, under which the originating company gets the lion's share of the receipts. The new clearing house will more nearly equalize the work and responsibility falling on each company, say the committee, and in the long run, they believe that the mileage basis will be fair and equitable to all.

The clearing house will be incorporated, probably with an authorized capital of \$10,000. Each subscribing company will buy one share and be entitled to one vote in controlling the business. The company will not be run for the purpose of paying dividends. The expenses will be paid by a charge for each message checked. What is left after expenses are paid will be rebated to the companies according to the number of messages checked for each. In this way, all will pay their share of expense according to the benefits derived. E. H. Martin, representing the Martin Telephone Company of Webster City, J. H. Plaister of Fort Dodge, and S. A. Dinsmore of Oskaloosa, were named a committee to draw articles of incorporation and perfect plans for its establishment. The committee will report at the meeting of the Independent Telephone Association, March 8, and, if as is altogether probable, their report receives the approval of the meeting, the clearing house will be in operation within a very short time thereafter.

The committee will seek the co-operation of all companies in the state in furthering the plan. Independent telephone men claim that not one county in Iowa is without many mutual lines, and that the men recently in Des Moines represented more invested capital than the total investment of the Bell interests in the state. It is estimated that the clearing house can open for business with an average of 30,000 toll line calls a month. While the Independent interests of Minnesota are not nearly so great as in Iowa, Mr. Brookins, secretary of the Minnesota clearing house, said that it caused a great saving to the companies interested.

TO THE ST. LOUIS FAIR EXHIBIT.

MR. B. F. WASSON, of Clinton, Ill., the president of the Farm & City Telephone Company, which is one of the largest Independent telephone companies in the State of Illinois, has been assigned the position of making a display of the evolution of the Independent telephone in the Electricity Building at the World's Fair at St. Louis. He has already quite a collection of the different parts of some of the old telephones, but

asks his telephone friends to help him out in his undertaking, by sending a telephone or any part of a telephone that is commonly found, to be placed in this collection. Everything that is entrusted to Mr. Wasson's care will be taken care of, and when put on exhibition will have the name of the loaner, when patented, and by whom manufactured. When the exposition is over the articles will be returned if requested without any expense.

TRANS-MISSOURI ASSOCIATION'S MEETING.

THE Trans-Missouri Telephone Association met at Richmond, Missouri, recently. It was composed of the owners of Independent companies in that section of the state. Mr. F. G. Taggart was re-elected president and James M. Deacy was retained as secretary-treasurer. The organization, originally local in scope, has now widened to the state. The next meeting will be held at Carrollton on the last Thursday in March. Richmond will get connection with Kansas City by March 1st. The connections to the east are already completed.

INDEPENDENTS IN NEW YORK SUBURBS.

THE Independent telephone movement is making big strides on Long Island, N. Y. (Suffolk County), and the officers of the several companies are predicting that within a year's time the eastern half of the island will be covered with a network of Independent wires. The first Independent movement was started in Riverhead by farmers. They formed a little company three years ago, with a capital of \$500, and built a line to Riverhead. It was a success, and business grew and the capital was increased to \$5,000, a year ago, and the line extended to Mattituck. A few days ago this concern, now known as the Baiting Hollow and Roanoke Telephone Company, increased its capital to \$20,000, and its officers are confident that this amount will be found inadequate within a few months' time.

This company has a line from West Baiting Hollow to Mattituck on the North road, and from Riverhead to Mattituck on the South road, with about 200 telephones and a central office in Riverhead. The company is at present constructing a line to Flanders, and expects to reach out along the South Side and also to erect a service as far east as Southold.

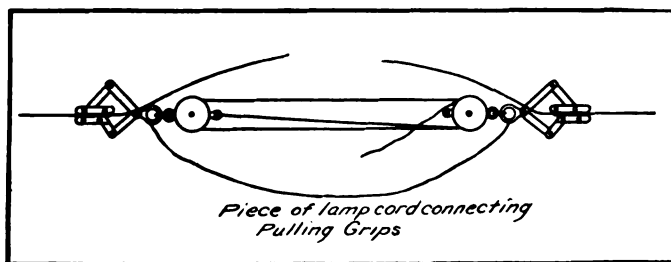
The North Shore Telephone Company, in which Port Jefferson residents are interested, has secured 200 subscribers, and will begin to construct its lines at once. A proposition has already been made for the Port Jefferson company to extend its lines to Wading River, and connect with the Baiting Hollow company at that place. The latter has promised to meet the Port Jefferson people at this point in the spring, and no doubt this will be done. The Patchogue company, organized recently, is about to commence business, and will erect its lines as soon as possible. This company is negotiating at present to connect with the New York and South Shore Telephone Company, at Bluepoint, and also to extend its lines as far as Medford, and there connect with the Port Jefferson company, and this arrangement will, no doubt, be carried out. When this is done there will be a great local service established and the stockholders of the several com-

panies are in high glee at the outlook. The Baiting Hollow company has demonstrated that the telephone business on Long Island is a paying investment.

The farmers and business men east of Cutchogue are anxious for the local telephone service and are talking of organizing a company to erect lines and connect with the Riverhead company. The time is near at hand when Independent telephone service will reach from Port Jefferson to Orient, on the North Side, whether the Southold farmers organize a company or not, because it is the purpose of the Riverhead company to extend its lines eastward as fast as possible.

ANOTHER SLACK CUTTING APPLIANCE.

RECENTLY there was published, in this paper, a description of a device to be used by linemen when cutting slack in a line, by means of which the continuity of the circuit was maintained while the line was opened, so that the new splice could be made. In that arrangement a length of wire having at



each end a clamp was used, and when it was desired to open the line the wire was clamped in shunt around the point where the cut was to be made. The drawing illustrates another method of accomplishing the same end. Here a piece of flexible lamp cord is soldered to each of the wire grips, thereby giving a circuit around the open point in the line.

CANADIAN INDEPENDENTS.

OVER \$10,000 has just been spent by the Vernon & Nelson Telephone Company in rebuilding and bettering the system and service in Phoenix, B. C., Canada. The force of linemen, under Superintendent Hodge, of Nelson, has been busy on the necessary changes for several weeks, and is now completing the finishing details. All local lines are now on a metallic circuit, something that no other city in the interior of British Columbia has as yet. A new switchboard has been installed in the central office, which latter has been fitted up with the latest improvements.

POPULARITY OF INDEPENDENT SYSTEMS.

THE following editorial from the Washington C. H., Ohio, *Herald* shows how Independent telephone systems are becoming a part in the daily life of American citizens:

"There seems to be a continuation of the revival of the Telephone movement, and the Independent system is making wonderful strides in its progression. This fact can be accounted for by the fact that when the Bell Company occupied the ground of unrivalled monopoly and the result of this monopoly convinced the progressive mind of advantages to be gained by competition, the Independent people recognized that to be successful they must do their best, must reduce cost, give better service, must meet their patrons with business propositions. These things they have done.

"Another reason for the success of the Independent movement is, telephone service is valuable in proportion to the number of subscribers connected with the system. This statement of fact brings forward some statistics: In Ohio the Independent people have about 150,000 telephones, the Bell less than 90,000; in Indiana the Independent outnumbers the Bell by 2½ times; in Kentucky two times, while in the United States the Independents have over 1,500,000 more telephones than the Bell, and the people in general and business men in particular are quick to understand and seize upon that which gives maximum service at mini-

mum cost—or, in other words, they are eager for the project that will reap the greatest harvest and reach the most people—hence the deserved popularity of the Independent.

"When the Independent movement first began to be agitated in our own little city, and the proposition made by the promoters, their great plea to the business men for success was, 'We will extend our lines and put you in communication with many more people, and at much less cost than you now pay the Bell people.'

"This argument appealed to the progressive mind that fully understood to increase business of our own town, they must transact it, not alone with its own citizens, but by reaching more people.

"Perhaps to this fact more than to any one other can be attributed the success of our Independent Telephone system, reaching as it does, 1,300 subscribers."

SOLICITING BY TELEPHONE.

THE telephone is rapidly taking the place of the solicitor after local business. Instead of the runner who goes from house to house to drum up trade for his employer, the telephone is being used by many of the larger merchants who have especially engaged employees to keep the wires hot in their search for new business, and in supplying the wants of old patrons. And the plan is working admirably. Many a merchant receives more orders through his telephone than come in over the counters. A Chicago man has built up a thriving business in this way. Instead of sending solicitors out each morning to the residences of desirable customers, he employed a couple of bright, intelligent young women to solicit orders over the telephone and to carefully enter all telephone messages. He now says that these two telephone clerks soon had a greater volume of business entering his establishment than any of his competitors could control. But he never made the mistake of having his clerks use both telephones at the same time for outgoing calls. He endeavored to always have one telephone door open so that customers could enter and make known their wants. And his instructions to every one in his employ are: "Responding promptly to a telephone call is only common courtesy; and courtesy, even to a telephone caller, may pay a very handsome profit."

CENTRAL UNION DISTRICTS INDIANA.

THE Central Union Telephone Company, under the pretence that the work of extension requires it, has announced that it will divide the State into four districts, with district superintendents and headquarters at Terre Haute, Logansport, Anderson and Ft. Wayne. Under the proposed plan the division superintendents will work under the general manager, with headquarters in Indianapolis. The officials of the company decline to discuss the details of the proposed plan further than it will be for the betterment of the service. It is generally believed that the company has been forced to put forth this effort in order to hold territory already developed.

PLATTSBURGH, N. Y., INSTALLATION BEGUN.

GROUND was recently broken for the placing of the first poles of the Clinton Telephone Company, of Plattsburgh, N. Y., which will have its Independent system in operation early next summer. A. H. Elmore, superintendent of the Glen Telephone Company, and superintendent of construction, recently was in Plattsburgh, in company with Foreman Morford. The poles now being put in are of cedar, but a large quantity of hollow steel poles are on their way and if the digging is not found too hard these will be put in position immediately upon their arrival.

CHILDHOOD'S UNDERSTANDING OF THE TELEPHONE.

HELEN, aged 3, had a conversation over the telephone recently with her papa, who was downtown. She was much mystified, and upon his return interrogated him as she gazed with wondering eyes at his somewhat expansive form (he weighs over 200 pounds): "Daddy, how did 'oo get into 'at little box? Daddy, 'oo're too big."



THE NOISY CLOWN TURNED BRAVO.

THE AMERICAN TELEPHONE JOURNAL has always brought to its work a strong sense of humor. Thanks to this, we have in the past been able generally to take a kindly and indulgent view of that very remarkable monthly publication known as *Telephony*. Its weird notions concerning the makeup and use of the English language, its marvels achieved in the creation of so-called "editorials," its "grand" typography all wool and a yard wide, its bizarre ideas on matters technical, and its picturesque, if crude, conception of the art of telephony, have in the past always appealed to us as rare specimens of that charming quality which one finds ordinarily only in the country newspaper, when the editor expresses his tense gratitude to those of his fellow-citizens who have showered on him the succulent watermelon, the giant yam, and the cord of well-seasoned hickory wood. Who, with any appreciation of humor, could resist such gems as we quoted recently from the prolific columns of *Telephony*, when the editor of that rare creation sang to us in a major key of his "troubles." Our readers will remember how the inspired editorial pen rioted in such simple phrases as:

"PHANTASMAGORIA of PATCHWORK paragraphs."

"The TRAGEDY OF VANITY DETHRONED."

"SHROUDED in the gloom and SHADOW."

Unfortunately the need of space for more serious work prevents a full reprinting of this merry dirge of woe, as it does the reprinting of some of the other choice bits that have appeared from month to month in *Telephony's* pages.

And still more unfortunately, we fear that in the future we shall have no stomach for quips of this nature from this source, for the reason that we find, much to our regret, that the clown has turned bravo, that the bumpkin has developed into assassin, the buffoon into the hired tool of a driving master. We have had our suspicions in this regard for some time, but have refrained carefully from voicing them until such time as the proofs should be conclusive. That time has now come, and we propose to do our duty in a manner that will put an end to the usefulness of an organ which has sold itself body and breeches to the nastiest monopoly in America, the Bell Telephone Company.

It will be remembered that THE AMERICAN TELEPHONE JOURNAL, in its issue of September 26, inaugurated a campaign against the Kellogg Switchboard and Supply Co. The editor of this paper gave notice in that issue that he believed the time had come when an end should be made to the anomalous and dangerous condition that had resulted in the Independent telephone field through the underhand purchase of the Kellogg Company by the Bell interests. The situation was set out at length and notice was

THE MASTERS OF TELEPHONY EXPOSED.

served that until the Kellogg Company was driven out of the field and its presence as an Independent manufacturing concern was utterly destroyed, THE AMERICAN TELEPHONE JOURNAL

would devote the greater part of its editorial space each week to an airing of the duplicity that had been exercised by the parties connected on both sides with the Kellogg sale.

This declaration and the presentation of the facts that followed had the effect apparently of throwing the Bell interests into a sort of panic. At any rate they lost their heads to such an extent that they showed their hand openly in another direction, revealing the fact that they controlled one of the publications in the telephone field that had theretofore been considered, even by those who had no respect for it, in favor of the Independent cause. This paper, *Telephony*, in its issue next following our arraignment of the Kellogg deal, appeared in a lengthy defense of the Bell people and of the principles involved in what has universally been set down as the most treacherous commercial action of recent times, as a piece of industrial brigandage that would make the doings of the Standard Oil Company almost respectable. Among other things this paper, *Telephony*, which up to this time had somehow masked its position, gave utterance to the following statements, among others, the italics wherever used being ours:

The sale was regular in every way and was made at a time when the Kellogg Company was seriously embarrassed financially. It is difficult to see what other fate than bankruptcy and total ruin could have befallen the company if the Bell men had not bought the stock and replenished the company's credit and treasury.

As a matter of fact it was not a Bell plan to buy the company; it was a last desperate resort of the Kellogg Company to prevent a disastrous business failure.

The conditions, briefly stated, were these: Mr. Kellogg was physically incapacitated for the work of managing his business, and after giving to Wallace L. De Wolf a full power of attorney, went to California in the hope of recovering the health he had lost. Mr. De Wolf was left with an empty bank account, enormous liabilities and uncollectable accounts. The embarrassments of the Everett-Moore syndicate, of which the Kellogg Company was among the largest creditors, had tied up indefinitely the only possible source of money with which to pay the Kellogg Company debts.

Made desperate by the importunities of creditors, and in constant apprehension of a ruinous crash, Mr. De Wolf, acting on the advice of Mr. Kellogg's son, L. D. Kellogg, sought, as a desperate chance, the help of Mr. Barton, president of the Western Electric Company (Bell), an old friend of Milo G. Kellogg.

The assistance, begged of him in behalf of a company which was avowedly antagonistic to the interests he represented, Mr. Barton was reluctant to grant. It would seem almost as if the Bell interests would have been better served if he had refused his aid, and had let the telephone world witness the spectacle of a failure which would have staggered Independent telephony to its foundations. Without his aid the Kellogg Company was doomed.

It is idle and senseless to claim otherwise. Capital was incredulous concerning Independent success, the largest Independent syndicate was practically a wreck. Mr. Barton was the Kellogg company's only hope. That he did not refuse his aid and permit the failure of the Kellogg Company was due simply to the fact that he permitted his feelings for his old friend, Milo G. Kellogg, to outweigh what unquestionably would have been insuperable reasons if any other Independent factory had been concerned.

But Mr. Barton was not acting as a philanthropist alone; he was acting as

a business man. He did not try to take advantage of the urgent necessities of the Kellogg Company in order to buy stock at an unreasonably low figure, but paid a fair price for what he bought.

Mr. Barton was honest when he bought, and arranged for his associates to buy. He was more than honest, he was fair to the Kellogg Company. What he bought and paid for, in a time when the future held no single gleam of hope without his aid, he and his associates are entitled to keep and do with as they please.

As to the action taken by Mr. Barton and the other Bell men associated with him, we believe that they deserve the thanks of every Independent, both for buying the Kellogg Company and for concealing the fact of their purchase afterwards.

It is known that other manufacturers of telephones have made and are making capital for themselves out of the Kellogg sale to the Bell. That is legitimate business if they tell the truth. Independent telephone manufacturers, who have been and are competitors of the Kellogg Company, could not be expected to overlook the opportunity which the Kellogg situation presents. They are human; shrewd business men; and hustlers for business. The Kellogg-Bell situation presents an argument in favor of their own products, and they have not been slow to take advantage of it. Their opposition to the Kellogg Company, or any movement engineered by them, cannot be looked upon as unselfish and unbiased. It is, too, evidently a matter of individual interest with them. If opposition to the Kellogg Company is to come only from the company's competitors in business, that opposition will probably not succeed in convincing any man who uses and prefers Kellogg apparatus, irrespective of the company's business connections.

Surely this was pretty work, though rather indiscreet, a fact that the masters of *Telephony* realized when it was too late.

Here was the whole Independent telephone field up in arms at the discovery that the Bell company, through the shabbiest business trick ever known, had secretly secured control of a manufacturing company that had for a period of nearly two years posed as an Independent concern, and loaded up Independent operators with apparatus supposed to have been made by men whose affiliations were all anti-Bell. Wherever Independent telephone men got together, this trick was the one topic of conversation, and denunciations of the men responsible for the deal were loud on all sides. Imagine, then, the shock when a publication that so far as outsiders generally were concerned, had always been deemed Independent in spirit, came out with this bald defense of the conspirators.

By your leave "it was not a Bell plan to buy the company." Never. The Bell company would not stoop to such a low trick; that was utterly unlike the Bell. The Bell, tricky? unscrupulous? underhanded? the Bell engineer such a deal as the Independent world was talking about? Not much, says *Telephony*. On the contrary, but for the philanthropy of the Bell company, but for "the aid of Mr. Barton," aid, *Telephony* assures us, that "Mr. Barton was reluctant to grant," we would have witnessed the "spectacle of a failure which would have staggered Independent telephony to its foundations." Only the extreme business benevolence of Mr. Barton and his associates prevented this.

Again, "Mr. Barton was honest when he bought and arranged for his associates to buy." Think of the gross injustice that we were all doing this high-minded gentleman and his friends, impugning their motives when all the time we have it on the assurance of *Telephony* that they were actuated only by the highest ideals. Is there anyone so base as to doubt *Telephony's* conclusion that Mr. Barton in this matter "was more than honest" and that "he and his associates are entitled to keep their purchase and do with as they please?"

In the face of such high-mindedness as glowingly painted for us by *Telephony* what shall we say to the minority stockholders of the Kellogg company whose instincts are so low and whose conception so debased that they actually have the impudence to bring a suit to set aside this great and noble transaction. Let us read the matter quoted once and visit on their heads the opprobrium they merit. Nothing less, certainly, will do justice to *Telephony's* friend, Mr. Barton, and the other

Bell men associated with him, men who as *Telephony* very properly tells us, "deserve the thanks of every Independent both for buying the Kellogg company, and for concealing the fact of their purchase afterwards."

To the foolish and uninspired outsiders this was the main feature in the offending, that the facts of the purchase had been carefully concealed for seventeen months.

All the other papers in the telephone field, all the operators, and every man connected with the Independent industry, were exclaiming particularly at the duplicity and deceit exercised here. But *Telephony* tells us calmly that this very duplicity was the supreme virtue.

However, it is all good, the entire extract, and merits the careful reading of every man in the telephone business who desires to be posted as to the various agencies for publication enrolled by the Bell Telephone Company, of Boston. Of course, this article in *Telephony* took the usual course. It was carefully put into type and spread broadcast by the Bell company, for consumption by the telephone operators with a little introductory note setting forth that it was an extract from a paper "devoted to the Independent interests, and may therefore be thoroughly believed." The Bell press bureau has been using it ever since, but latterly with poor effect, as THE AMERICAN TELEPHONE JOURNAL and all the other real Independent papers in the field, *Sound Waves* and *The Telephone Magazine*, have rather spoiled the efficiency of such literature by getting the true facts before the Independent operators and hammering them in persistently.

As for the paper *Telephony*, it has, of course, received a body blow by coming out so openly in its true guise. Its advertisers have fallen away from it at a rate that would have bankrupted the publication if it depended on the usual sources of revenue common with other trade papers. Its subscribers have dropped away and it is being refused admission even on a free basis by the Independent operators to whom it is sent. Of course this financial collapse has no serious effect on the people behind the paper, for after all what is a small newspaper investment to a concern like the Bell that can buy up a great manufacturing plant such as the Kellogg, not because it wants it or can run it on a commercial basis, but because it desires to misuse it to the detriment of the Independent interests. Where the real rub comes now with the masters of *Telephony* is not the loss in dollars and cents through the decay of the publication, but that the newspaper property has lost its usefulness as an organ and hence there is no further opportunity to foist off Bell arguments in an "Independent" paper.

PARIS-ROME TELEPHONE EXPERIMENTS.

THE postal and telegraphic administration in France has for some time been studying the possibilities of opening a direct line from Paris to Rome. Six circuits connecting Lyons directly with Turin, Genoa, Milan and three other Italian cities are already in operation; moreover, Turin is connected with Rome.

By these already existing circuits—Lyons-Turin and Turin-Rome—experiments of direct communication between Paris and Rome have been made, but have proven entirely unsatisfactory. "The words that reach us are hopelessly indistinct," said an official when questioned concerning the outcome of the experiments. It is probable that a technical commission will be appointed which will decide on the proper methods to put the lines into commercial talking shape.



Conducted by *A. H. McMillan*

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

FRANCHISE DOES NOT BAR INDIVIDUAL'S RIGHTS.

WE have a franchise at Niles, Ohio, and have been operating there for five years. Recently we built a line out beyond the city limits to reach a few subscribers, getting the customary signed right-of-way from all property owners along the road outside of the city limits and having the city engineer give us the location of poles from the end of our lines at that time to the city limits, according to franchise. A property owner *inside city limits* now demands a settlement from us for four of our poles that are along the front of his land. Can we be held up in this way?

W. & W. TELEPHONE CO.

YOU do not state whether the fee of the street is in the abutting owner or the city. In other words, does the property owner own the land to the center of the street, and has the public merely a right of way over it for street purposes, or does the city itself own absolutely the land that constitutes the street? The answer to your query seems to me to depend upon the answer to the above question. If the abutting owner has title in fee to the land that constitutes the street, there is no doubt under the decisions of the Ohio courts that he has a right to compensation for the four poles that stand in front of his lot. The franchise of the city gives you the city's permission, but does not deprive the land owner of his right, which is distinct from the municipality's. *Smith v. Printing and Teleg. Co.*, 2 Ohio Cir. Ct. R., 259; 2 Am. El. Cas., 237; *Dailey v. State*, 51 Ohio, 348; 5 Am. Elec. Cas., 187; 37 N. E., 710.

If the title to the street was absolutely in the municipality, the courts might rule differently as they have in other states. *Irwin v. Great Southern Teleph. Co.*, 37 La. Am., 63; 1 Am. El. Cas., 709. The Ohio cases so far decided have all been cases where a rural highway, not a city street, was involved. The Ohio courts might hold that there was a distinction between city streets and rural highways and that poles that would constitute an additional burden upon a rural highway and entitle the abutting owner to damages would not be a burden upon a city street and thus not entitle a city lot owner to compensation. See *Weeks v. New York & New Jersey Teleph. Co.*, 83 N. Y. Supp., 678; Am. Tel. Jour. vol. 8, Nos. 9, 17.

MICHIGAN TELEPHONE COMPANY SALE CONFIRMED.

IN a long opinion handed down from the bench of the United States District Court at Detroit, Mich., Judge Swan denied the petition for intervention of the minority stockholders of the Michigan Telephone Company and confirmed the sale under foreclosure of the property to N. W. Harris.

The court in reviewing the history of the telephone company previous to July, 1902, when the company made its first default in the payment of interest, said that the finances of the company were at that time a matter of public notoriety, and had been discussed at length in the newspapers, so that the minority stockholders had abundant opportunity to inform themselves of the condition of their interests in the company. After the transactions looking towards a foreclosure were well under way, the minority stockholders, the judge thinks, had every facility for inquiry and investigation. They could have taken active measures at any time.

The charges of fraud and collusion made in court against members of the Old Colony Trust Company and the Michigan Telephone company, Judge Swan dismissed as shadowy and indefinite. The charge that the price at which the property was sold, \$4,100,000, was inadequate, was not supported by the offer of a higher bid. Any such inadequacy would have to be so

gross as to shock the conscience and be joined with features apparently unfavorable and wrongful to justify intervention for that cause alone. Since then, the stockholders failed to take active measures, and the affidavits and other evidence are such as abundantly meet and refute charges made by the petitioners in their request that the sale be not confirmed and a bill of review granted, the sale appears perfectly proper. No bill of review should be granted except for sound moral reasons, or because of errors in law, neither of which the court finds in the record of this case. The court feels that public interest demands that such sales should not be lightly set aside. The court finds no reason to believe that the sale was not in good faith.

It is said an appeal will be taken by the petitioners. U. S. Dist. Court., Eastern Dist. of Michigan.

IS TALK OVER THE TELEPHONE PRIVATE?

THE question whether a man talking over a telephone is indulging in public or private conversation has come up in a suit before the circuit court of Macon county, Mo., but has not yet been decided. D. S. Farmer, treasurer of a telephone company operating from Macon, and K. F. Jenkins, president of the company, are the parties to the suit, Farmer asking \$5,000 actual and \$2,500 punitive damages from Jenkins. He alleges that Jenkins made slanderous remarks and charges over the company's telephone and that subscribers on the line had receivers to their ears and heard every word. The attorney for the defendant makes the defense that a telephone conversation is a private one and that a man cannot be accused of slander for anything he says over it. He alleges that it is not the speaker's fault if subscribers listen. It would seem, however, that the defendant must be held to have assumed all risks of being overheard, and if actually overheard by third persons should be held liable. The Macon county circuit court, in which the above question arose, recently held that reading a notice of appeal to a lawyer over a telephone was not legal notice, even though a copy of it had been previously tacked up on his door.

Circuit Court, Macon Co., Mo.

CITY CANNOT BUILD AND RENT CONDUITS.

THAT it would be an illegal proceeding for a city to lay conduits in its streets and charge rental for their use for wires of telephone and telegraph companies is the opinion of City Solicitor Hogan, of Lowell, Mass., who has prepared and presented to the city council an extensive brief on the subject, citing many authorities. He believes power might be given the council by legislative statute to take the action proposed and that the telephone companies could not object. He thinks, however, that it can not be done under the general powers and duties conferred upon cities.

CAN TELEPHONE TO ARCTIC OCEAN.

TELEPHONING to the shores of the Arctic ocean has now been made possible, according to the Swedish journals, by the extension of a line running from Stockholm to the north. The small village of Narosk, which forms the terminal point of the most northern line of railroad in the world, has been connected recently with Stockholm. The length of the new line, which extends to the Arctic ocean, is about 600 miles.

Questions on any subject relating to the technical side of telephony will be answered in this column.

ACCURACY OF OHMMETER.—(261.)

With the new home-made ohmmeter described in the JOURNAL of December 5, about what is the maximum and minimum resistance which may be measured with a degree of accuracy, within two or three per cent?

D. H. C.

The ohmmeter which we described is capable of measuring from .001 of an ohm to one million ohms if it be equipped with a sensitive receiver and a powerful electric generator.

PARALLEL WOUND IMPEDANCE COIL.—(262.)

What is meant by a parallel wound impedance coil such as I have read about in connection with duplexed lines? Can you give me a diagram of one? What are the advantages of this type?

I. C. I.

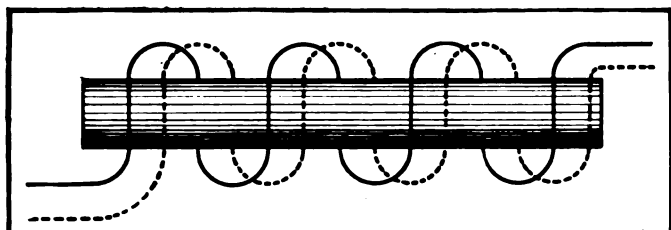


Fig. 262a.

A parallel wound impedance coil is often, although not always, understood to mean an impedance coil which is wound with two wires, each forming a separate and distinct circuit. These wires are wound side by side upon the core, sometimes in the same direction and sometimes in the reverse direction. The accompanying sketch (Fig. 262a) shows diagrammatically such a coil. When a coil of this description is used on duplexed telephone lines the two coils are in series when the instrument *T'* (Fig. 262b) which is bridged across the line is talking, and therefore the voice currents are not shunted to any appreciable extent. When instrument *T* is talking as one winding is reversed from the direction of the other the voice currents only encounter the ohmic resistance of the coils, and do not suffer sensible retardation.

TRANSATLANTIC TELEPHONE CABLE.—(263.)

Have there ever been any experiments on a telephone line across the ocean, and if not, why not? Also how much cable would be needed to reach from New York to London (number of miles)?

B. H. C.

No practical experiments have been made on a telephone line across the ocean on account of the expense of constructing the

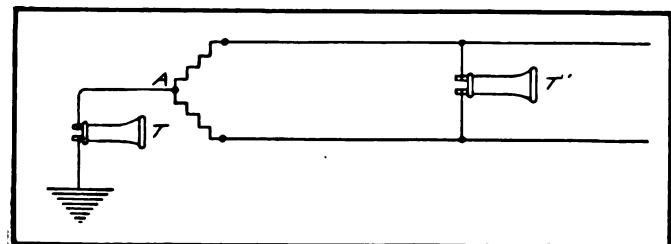


Fig. 262b.

cable. The length of the cable from New York to London would depend upon the route selected, and would be anywhere from three thousand to thirty-two hundred miles. The size of the wire would depend upon the kind of cable. Usually submarine cables are made of a number of strands of small wire twisted together. From 18 to 22 wire is usually used. It is probable that the method of cable construction now in use would have to be radically changed before a cable as long as you suggest could be made to talk satisfactorily. The electro-static capacity

of an ordinary cable of this length would be so great that probably the transmission would be cut down to nothing.

CAUSE OF BELL TAPPING.—(264.)

Why is it that every time I take my receiver off the hook the bell to which the green cord goes gives a tap?

C. E. D.

With a modern common battery circuit sub-station a condenser is provided which is charged by the common battery when the telephone is removed from the hook. This produces a slight flow through the line which is sufficient to cause the bell to tap.

AN INDUCTION QUESTION.—(265.)

We intend to build a toll line fifteen miles long of No. 8 iron wire, and will transpose it. We probably will have to parallel a telegraph line for six miles. The telegraph line runs on the other side of the road. Do you think the telegraph line will give us trouble by induction? The sketch (Fig. 265) shows diagrammatically the conditions. How often will we have to transpose our telephone line?

N. K. L.

It is quite probable that under such circumstances as you specify there would not be any inductive disturbance from the telegraph line. The best practice in cases of this kind is to make four transpositions per mile. If, after making four transpositions per mile, the line is in any way noisy additional transpositions may be introduced. These should invariably be cut in at regular intervals.

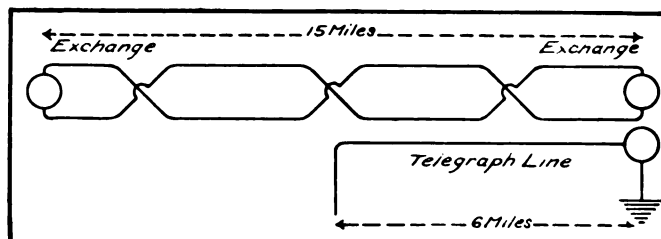


Fig. 265.

INDUCTION ON LINE.—(266.)

(1) Would a telephone wire receive any induction if laid close to a 550 volt direct current circuit?

(2) Why is the battery grounded on one side on a common battery telephone exchange? Which side is grounded?

(3) Is one side of the ringing circuit grounded? If so, why? (Common battery exchange.)

N. J. W.

No. 1. An untransposed telephone line will be troubled with induction if laid in proximity to any kind of a circuit which carries a varying or unsteady current, and will not be troubled with induction if placed near a circuit which carries a perfectly steady current, not matter what that current is.

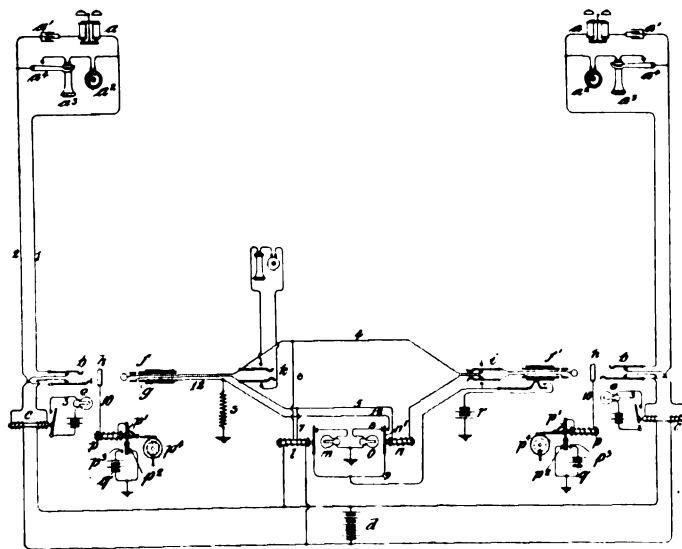
No. 2. The battery in a common battery exchange usually has the positive side grounded. The object of this ground is to render the various lines less susceptible to inductive disturbances. For example, if there is a line running east that has low insulation and another line running west, also of low insulation, the eastern line may become noisy and render the western line noisy, because the disturbing currents entering the eastern line can only find an outlet through the low insulation of the western one. If, on the other hand, the battery is grounded, the disturbing currents coming in from the east will seek earth at the battery and leave the western line unaffected. It is usual to ground the positive side of the battery because it is considered that a ground at this point will cause less difficulty from electrolysis.

No. 3. Some times ringing circuits are grounded and some times not. If there are any lines which "ring ground and talk metallic," it is of course necessary to ground the ringing generator.

PATENTS ISSUED

CONNECTION COUNTER FOR TELEPHONE LINES.

F. R. McBerty, of Evanston, Ill., is granted re-issue of patent (No. 12,185) and assigns to the Western Electric Company of Chicago. This is a device for registering a number of calls which originate in every telephone station. Its is particularly the object of the inventor to provide a method whereby only completed connections shall be registered. The circuit is illustrated in the figure, in which each subscriber's sub-station is provided with a polarized bell *a*, a condenser *a'* and hook switch *a4*, and transmitter and receiver *a2* and *a3*. From the sub-station a metallic circuit *1* and *2* extend to the central station and end in a jack *b*. This jack is provided with a line relay *c*, lamp signal *e*. A cord circuit consists of the two plugs *f* and *f'*, the central office battery *d*, supervisory relays *1* and *n*, with their lamps *m* and *o*. The recording apparatus is legged from the ring of the jack *h*, consists of conductor *10*, electro magnet *p* that operates a register *p4* with a local battery *Q* and the two contacts *p2* and *p3*. The operation of the system, including the counting mechanism is as follows: A subscriber requiring connection with another removes his receiving-telephone from its switch for use. This act permits current from battery *d* to flow in the

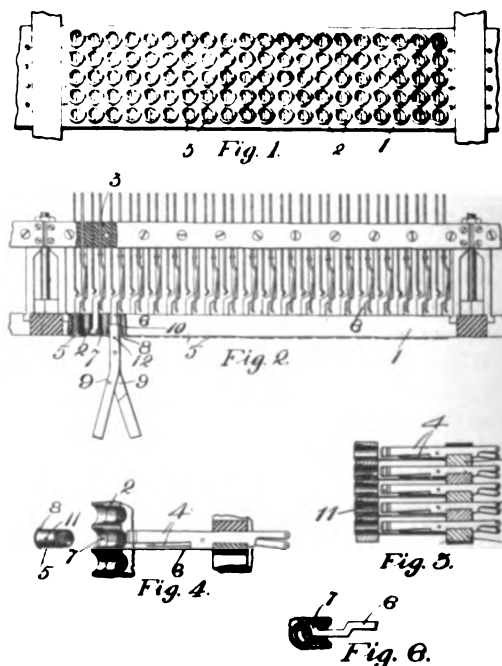


line, which excites the relay *c* and displays the line signal *e*. The operator answering inserts plug *f* in the spring-jack of the line and brings her telephone into connection with the circuit to learn the subscriber's order. The insertion of the plug in the spring-jack cuts off the connection of the line with the relay, and thus permits the extinction of the lamp *e*. The current created in the conductors of the plug-circuit by battery *d* causes the excitement of relay *1* and prevents the display of the clearing out signal *m*. In completing the connection the operator inserts the plug *f'* into the spring jack of the line called for and rings the bell at the station of that line by means of key *i* in the usual way. It will be observed that the insertion of the calling plug into the spring jack of the called line does not complete any connection with the counting mechanism of that line. When the subscriber called responds to the signal and removes his telephone from its switch for use, the relay *n* attracts its armature and connects the battery *r* to the conductor *12*, whereby current is supplied through the magnet *p*. This magnet attracting its armature operates the registering on counting mechanism *p4* and at the same time brings its armature-lever into connection with battery *q*. This latter battery now has a circuit through the magnet *p* and through the resistance coil *s* to earth. Hence subsequent movements of the armature of relay *n* cannot ma-

terially affect the current through the magnet *p*. It will be understood that magnet *n* is responsive to each act of the subscriber at the called station in replacing his telephone on its switch or removing it therefrom, each replacement of the telephone being signalized by the lighting of the lamp *o*. The response of the called subscriber is registered but once by the connection-counter, however. When both subscribers replace their telephones on their switches, the currents through both relays *1* and *n* are interrupted and both lamps *m* and *o* become lighted. The lighting of the clearing-out signal *m* is a signal for disconnection and is followed by the removal of plugs *f* and *f'* from the spring jacks of the lines. The removal of plug *f* breaks the connection between wires *10* and *12*, and thus interrupts the current from the battery *q* through magnet *p*. Hence this magnet releases its armature, which falls back in readiness to register a new completed connection.

IMPROVED MULTIPLE SWITCHBOARD.

C. M. Hedman, of Chicago, Ill., patents (No. 747,421) and grants same by assignment to the Stromberg-Carlson Telephone Mfg. Company an improved method of manufacturing multiple

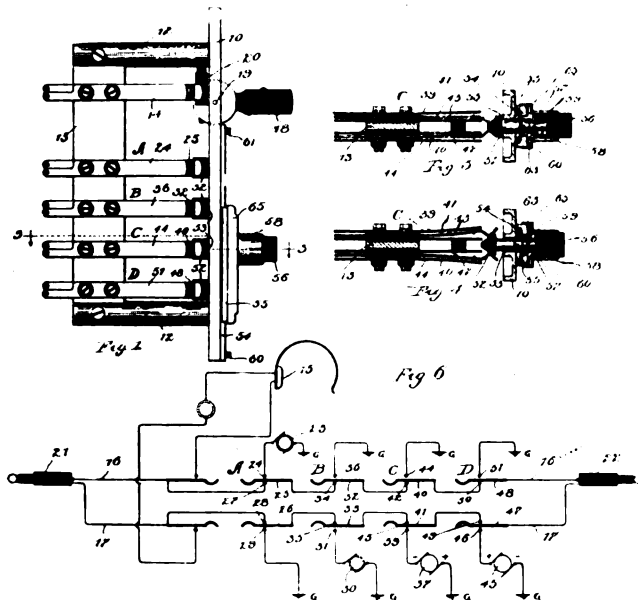


jacks. The object of this invention is to provide a means whereby the test ring of the multiple jack may be more substantial and more solidly constructed and more easily repaired in case it gets out of order. This invention is illustrated in Figs. 1 to 6, inclusive. There is a vertical support *1* having the plug openings *2*, an insulating support *3*, upon which the line springs *4* are mounted. The test thimbles *5* are located in the plug openings and are to be connected with the test conductors *6*, which are made of a strip of stamping. The test conductors are shaped in the form of rings *7*. The rear portion of the plug openings back of the ring *7* are threaded and the test thimbles correspondingly threaded and are provided with shoulders which engage the front edges of the ring *7*. When the test thimbles are screwed into place the shoulders *8* are driven into engagement with the ring *7*, making a substantial and solid connection.

IMPROVED SWITCHBOARD KEY.

Wm. Kaisling, of Chicago, Ill., patents (No. 746,095) and assigns to the Stromberg-Carlson Telephone Manufacturing Com-

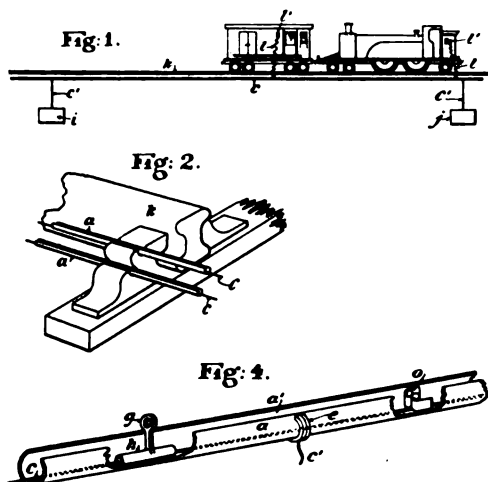
pany, an improved cord shelf key. This invention is diagrammatically shown in Figs. 1, 3, 4 and 6. The object of this invention is to provide a key for ringing party lines which shall be economical in manufacture, shall be positive of action, and shall always notify the operator which party was rung last. Fig. 1 is a side elevation of the key. Figs. 3 and 4 cross sections, and Fig. 6 a diagram of the cord circuit. The inventor provides four or more separate pairs of key springs, *A*, *B*, *C* and *D* (Fig. 1). He also provides a listening key 14. Upon the cord shelf an es-



cutcheon plate 10 is mounted, upon which is a sliding piece 65, that carries a button 3, which operates a plunger 57, (Fig. 3), whose end carries a wedge-shaped piece 52, that is adapted to operate any one of the set of contact springs *A*, *B*, *C* or *D*. By sliding the plate 65 to and fro upon the escutcheon plate the plunger may be dropped successively over any set of springs and by connecting the different sets with various kinds of ringing current the operator may send any desired current to a substation. As the sliding plate 55 remains wherever placed, the operator can always tell what form of ringing current was last used.

METHOD OF TELEPHONING TO MOVING TRAINS.

James Edgar, of Wrexham, England, patents (No. 746,690) an improved method of communicating with moving trains. This is illustrated in Figs. 1, 2 and 4. Fig. 1 is a general diagram showing the track, together with locomotive and train, and the

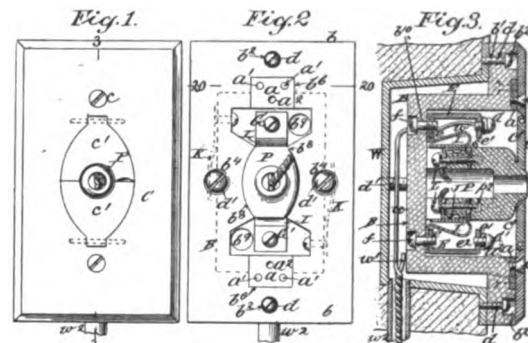


stations *i* and *j*. Fig. 2 shows the detail of the means which the inventor employs. In this illustration *X* is an ordinary railway rail which is held in a special chair that is arranged to carry one or more conductors. These conductors, as shown by Fig. 4,

consist of a wire *c*, which is enclosed in an insulating tube *a*. This tube has a slot through the top, by means of which a moving contact *O* can be introduced into the tube and bear upon the conductor *c*. By this means an insulated conductor is provided, that by the sliding contact connects with the train. Any person at the stations *i* or *j* may, therefore, signal the train either telegraphically or telephonically, as may be desired.

IMPROVED ELECTRICAL SOCKET.

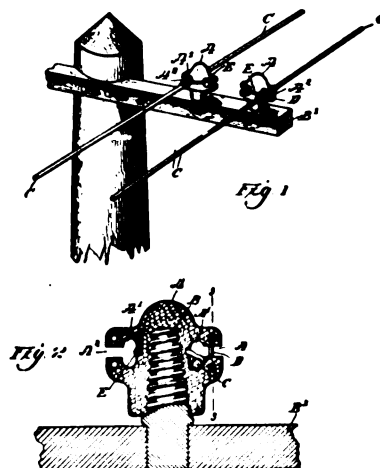
F. J. Russell, of New York, N. Y., patents (No. 746,580) an improved socket. This invention is shown in Figs. 1, 2 and 3, which are respectively front elevation with the front plate removed, and a section. In these drawings *W* represents the usual metallic wall outlet box. *b* is the main terminal box, made of



insulating material, with a flange *b* extending round its edge and used to hold the box in place. There is an inlet *W2*, through which the conductors *W'* are extended and secured to the screws *f* and *f* in the bottom of the insulating terminal box. These screws connect with the terminal pieces *e* which are provided with the springs *i*. A conductor receptacle *P* is provided which contains two contact pieces *J*, to which the flexible conductor is secured by the screws *i*. When this conductor is placed in position in the terminal box it makes contact with the springs *i*. The plate *C* holds the conductor receptacle in place.

IMPROVED INSULATOR.

Edward F. Schoenthaler, of Long Branch, New Jersey, patents (No. 744,631) and assigns two-thirds to W. H. Parker and Joseph Finn, of Long Branch, an improved insulator. The object of this invention is to provide an insulator of such construction that the ordinary tie wires will not be necessary, although they may be used if desired. This invention is shown in Figs. 1 and 2. Fig. 2 is a cross section from which the insulator is seen to consist of a piece of moulded insulating material such as glass or pottery, *A*. On each side of the insulator there are two slots *A'* so constructed that the wires may be introduced in the slot and lie upon the bot-



tom of the same. The slot is then closed by a link *A2*, and thus the wire is prevented from escaping from the insulator. By providing two slots each insulator may carry two wires and if desired, in addition the wires may be tied, as shown in Fig. 1.



FINANCIAL

GLOVERSVILLE, N. Y.—The Glenn Telephone Company has increased its capital stock by \$50,000.

MIDDLETOWN, N. Y.—The Warwick Valley Telephone Company has declared a semi-annual dividend of 2½ per cent.

ELYRIA, O.—The Elyria Telephone Company has increased its capital stock from \$50,000 to \$100,000. W. E. Brooks is president of the company.

FRANCHISES

OTTAWA, CANADA.—The Stark Electrical System, Limited, through its president, H. Waddington, has applied to the city council for a franchise to install its system.

GENESEE, IDAHO.—The C. E. Wood Company has succeeded to the telephone franchise which the city council granted to T. A. Pieplow, and will at once install a system.

CENTRAL CITY, NEB.—The Hamilton County Independent Telephone Association, represented by Mr. Graham, of Marquette, appeared before the city council recently and asked for a franchise to construct a local exchange.

WOODSTOWN, N. J.—The Eastern Telephone Company, of Camden, has applied to the borough council for a franchise.

FAIRPORT, N. Y.—The Rochester Telephone Company has applied to the town board for a franchise to operate in this place.

COLUMBUS GROVE, O.—The Cairo Mutual Telephone Company has been granted a franchise to construct and operate an exchange here.

UNADILLA, N. Y.—The Board of Trustees has granted a franchise to the Riverside Telephone Company.

CINCINNATI, O.—The city council, by a vote of 17 to 11, has taken the four petitions for franchises for Independent telephone companies from the committees and made them a special order for the meeting to be held January 13th.

COMBINATIONS

WASHINGTON, ILL.—The Washington City Rural Telephone Company has purchased the Washington Telephone Exchange from Receiver Heald of the Peoria & Eastern Telephone Company. Paul Goddard is president of the new company.

WEBSTER CITY, IA.—D. C. Chase, of this place, is negotiating for the purchase of the Vaughn Telephone System at Blairburg and at Williams.

HARTSGROVE, O.—The Hartsgrove Citizens Telephone Company has been organized and has consolidated the two telephone companies of Hartsgrove. L. W. Lee, whose address is R. F. D. No. 2, Rome, Ohio, is the secretary.

WAUPACA, WIS.—The Waupaca Telephone Exchange has been sold to the Independent Consolidated Telephone Company of Milwaukee. The local exchange has 246 telephones and toll lines running to over 25 adjacent towns.

RATES

WASHINGTON, ILL.—The Citizens Telephone Company will raise the price of residence telephones from \$1 to \$1.25 per month.

LOGANSPOUT, IND.—The Logansport Home Telephone Company has increased business rates for telephones to \$30 a year instead of \$25, the raise in rates being made because of the increased cost of operating the plant. Rates for residence telephones, \$15 a year, will remain the same.

CORNING, N. Y.—The Corning Telephone Company has raised its rates on residence service from \$12 yearly to \$14, and on business service from \$20 to \$24. While this is an increase of about 20 per cent., the rate is still lower than that of the Bell, which is \$18 for residences and \$30 for commercial service.

GRAND RAPIDS, WIS.—The Home Telephone Company has reduced the toll rates in this county from 15 cents for a three minutes' talk to 10 cents for a talk covering five minutes. It is expected this marked reduction will result in greatly increased use of the Home service throughout St. Joseph County.

ELECTIONS

STANHOPE, IA.—The Northwestern Telephone Company, at a meeting held here recently, elected the following officers: J. D. Hook, president; John Riley, treasurer; O. Brewer, secretary; Mason Hill, George Kent and Robert Fisher, directors. It was voted to connect with the exchange at this place.

KENSINGTON, MD.—The Kensington Telephone Company, notice of organization of which was given yesterday, has elected the following officers: Byron A. Chapin, president; Eugene Jones, vice-president; George R. Taylor, secretary, and C. E. Bruington, treasurer.

SIDNEY, N. Y.—The Riverside Telephone Company has elected the following officers: A. L. Lily, of Bainbridge, president; George Hyatt, of East Guilford, vice-president; A. E. Covey, of Sidney, secretary, and E. R. Smith, of Sidney, treasurer.

KIMBALL, S. D.—The Local Telephone Company has elected the following officers: Dr. Willy, president; C. R. Tinan, vice-president; A. S. Stuver, secretary; H. W. Hinrichs, treasurer; A. M. Bowles, general manager. A dividend of 2 per cent. was declared.

UNDERGROUND

NEW BEDFORD, MASS.—The Southern Massachusetts Telephone Company has been granted permission by the board of aldermen to lay underground conduits on County street from Pope to Locust.

GLENS FALLS, N. Y.—The village board of trustees will call a conference of all companies owning electrical wires in town to consider the matter of having them placed underground in the business part of the village.

MISCELLANEOUS

EVANSTON, ILL.—The city council gave David B. McMullen permission to install his telephone system in the city hall for one week for a test.

VINTON, IA.—The first annual meeting of the Farmers' Mutual Telephone Company, of Vinton, Benton County, will be held in the court house in Vinton on Tuesday, January 5th, 1904. A. A. King is the secretary.

MOBERLY, MO.—The Moberly telephone girls have organized a union. These officers were elected: Anna Whittington, president; Lyda Chapman, vice-president; Effie Owsley, secretary; Maggie Robertson, treasurer; Lottie Henrietta, guide; Maud Holloway, guardian; Mrs. Branham, trustee.

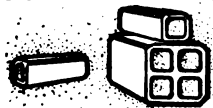
CUMBERLAND, MD.—The Western Maryland Telephone Company has elected the following officers: James A. McHenry, president; Duncan R. Sloane, vice-president; Henry J. Glick, treasurer, and Carl C. Hetzel, secretary.

PERSONAL

R. S. HAMILTON has been appointed manager of the Bell Telephone Company of Gas City and Jonesboro, Ind., in the place of E. C. Caffee, of Gas City, who has resigned.

FRANK S. CHAPMAN has been elected manager of the Kenton Telephone Company's plant by the board of directors, at Kenton, Ohio. He succeeds Mr. C. E. Nicholas, who goes to Columbus, Ohio, to superintend a factory that will manufacture an apparatus invented by him. Mr. Chapman was formerly manager of the Central Union office in Kenton, but resigns the position of manager of the Independent plant at Shelby to take charge of the Kenton plant. The change took place on January 1st.

MR. C. E. NICHOLAS, who has for two and one-half years been manager of the Kenton, Ohio, Telephone Company, has resigned his position with it and will go to Columbus, Ohio, to superintend the manufacturing of an apparatus invented by himself.



New Construction in the Field



ST. ANTHONY, IDAHO.—The Independent Telephone Company, with headquarters here, has commenced operation on the construction of its lines, using St. Anthony as a central point. It will extend to the following places: Parker, Eagen, Plano, Rexburg, Marysville, Tecton. C. H. Vandevier is at the head of the company.

GREENVILLE, ILL.—S. L. Abbott, manager of the local telephone system, will reconstruct the system in a short time.

BRAZIL, IND.—President John Künner and Secretary Michael Murphy, of the Citizens Telephone Company, are in Chicago purchasing supplies for improving and enlarging the local system. The additions planned will cost \$5,000.

EAGLE, COLO.—W. S. Parkerson, promoter of the Eagle Valley Telephone Company, is here superintending the construction of the system in this place. A line is being constructed between Eagle and Wolcott.

WELLMAN, IA.—The directors of the Mutual Telephone Company have decided to install a new switchboard.

ROANS PRAIRIE, TEX.—T. J. McCune, of this place, is reconstructing the Madisonville telephone line which runs through the center of this county. The line was recently purchased from R. L. E. Upchurch.

FOSSTON, MINN.—Mr. Kvien, proprietor of the local telephone system, will construct a line to Theodore in the spring.

MOUNTAIN LAKE, MINN.—The North Star Telephone Company, of this place, of which J. D. Schroeder is manager, will construct a line taking in Comfrey, Springfield, Darfur, Swedahl and Delton.

GERRY, N. Y.—The Gerry Telephone Company will extend its lines to Sinclairville.

NEW YORK CITY.—The *Commercial Bulletin* in a recent issue gave the following: "An American syndicate is to build a long distance telephone system on the Pacific coast of Mexico. Henry Lavett is reported to represent Ohio capitalists, and has gone to Durango regarding the project."

GRANVILLE, N. D.—H. B. Whitcomb will install a local telephone system. He will charge \$2.00 a month for business telephones.

MARTINSBURG, W. VA.—Miller Brothers, fruit growers, of Martinsburg, Pomney and Paw Paw, are constructing a telephone line from Capon Forks to Gerardstown.

KINSLEY, KAN.—The Kinsley Telephone Company has decided to build a toll line to the Tatum ranch in Hodgeman County. Several subscribers will be connected en route.

SWISS TELEPHONE STATISTICS

In a recent issue, our esteemed contemporary, the *Journal Telegraphique*, publishes the following interesting comparative statistics of telephonic operation in Switzerland for 1901 and 1902:

	1901.	1902.	Increase.
Local exchange calls	21,952,222	23,242,737	1,307,515
Long distance calls	3,828,338	4,079,560	251,222
Calls within 30 miles.....	728,597	808,242	79,645
Calls from 30 to 60 miles.....	178,224	205,396	27,172
	4,735,159	5,093,198	358,039

INTERNATIONAL SERVICE.

Out-going calls	42,966	54,454	11,488
In-coming calls	52,937	67,781	14,844
	95,903	122,235	26,332
Telephone messages transmitted partly by telegraph	233,002	239,546	6,544
Total communications	27,002,997	28,701,620	1,698,623

These statistics show an increase of 5.96 per cent. for exchange service, 7.56 per cent. for toll line service, and 20.46 per cent. for international work. Telephonic business transacted with the aid of the telegraph shows an increase of 5.20 per cent. There are 103 telephone stations, which in American parlance would be termed "public pay stations."

In 1892 the business transacted in these stations was as follows: Exchange calls, 199,363; toll line calls, 127,700; total, 327,063. This gives an average of 3,175 calls per station. The following table gives a list of the principal exchanges with the average calls per day:

Zurich	15,013
Geneva	9,164
Bale	8,943
Berne	5,039
Lausanne	3,695
St. Gall	3,345
Lucerne	2,309
Chaux de Fonds	1,952
Bienne	1,310
Neuchatel	1,263
Montreux	1,213
Winterthur	1,207
Schaffhouse	1,031

The annual traffic is given by the next table, which gives the name of the exchange, exchange calls, toll calls, and total business, and which shows some very interesting data.

Exchange.	Exchange calls.	Toll calls.	Total Business.
Zurich	4,896,768	1,090,593	5,987,361
Bale	3,064,603	402,641	3,467,244
Geneva	3,236,076	223,941	3,460,017
Berne	1,587,427	481,541	2,068,968
Lausanne	1,186,887	305,555	1,492,442
St. Gall	1,016,100	340,279	1,356,379
Lucerne	716,712	234,304	951,016
Chaux de Fonds	622,893	182,196	805,089
Bienne	392,361	159,507	551,868
Winterthur	324,920	221,628	546,548
Neuchatel	383,439	152,980	536,419
Montreux	372,100	137,949	510,049
Schaffhouse	324,718	100,288	425,006
Aarau	197,221	124,689	321,910
Vevey	209,650	106,242	315,892
Soleure	204,539	104,213	308,752
Fribourg	200,478	102,208	302,686

The financial results of the Swiss telephone systems are also interesting. The balance sheet is as follows:

Rental of sub-station.....	\$519,784.00
Receipt from calls.....	606,498.00
Receipt from municipal.....	4,090.00
Betterments	50,527.00
Miscellaneous	47,411.00
	\$1,222,310.00
	255,949.00
	\$1,478,259.00

EXPENSES.

Salaries	\$354,587.00
Superintendence	8,818.00
Office expenses	21,485.00
Buildings	30,776.00
Construction account	212,377.00
Apparatus	202,138.00
Sundries	3,116.00
Interest	170,095.00
Depreciation	475,073.00
	\$1,478,259.00

These figures show that the Swiss telephone system is being highly developed. They should be very interesting to American telephone engineers.

FARMERS' COMPANY MEETS WITH SUCCESS.

THE Riverside Telephone Company, which was organized at Bainbridge, N. Y., last summer as a farmers' co-operative company, is meeting with much success in projecting its new telephone lines.

The plan is for each telephone taker to subscribe for \$10 worth of stock or furnish a given number of poles, and provide his own telephone. Thereafter the cost will be only the relative expense of keeping the line in order and maintaining a central office.

The company already has lines connecting Bainbridge with all the towns on down the valley to Binghamton, with Sidney, Rockdale, Mount Upton, and Upper Ideuma. A line has been completed from the upper Sand Hill locality to Wellsbridge and men are now setting poles from Sidney to Wellsbridge. About twenty-five subscribers have been secured for a branch from Unadilla Center to connect at Unadilla. It is desired to set poles on the back streets of Unadilla and maintain a central office there, and also to conduct a local or village business. No additional fee will be charged for conversing over any or to all points touched by the company.

HAVE RID A COUNTY OF TRAMPS.

THE value of rural telephones is recognized in Henry County, Ind., because of their aid in ridding the county of tramps.

As soon as tramps appear and begin to terrorize families the sheriff is telephoned for and he corrals them immediately. 'Tis a fact tramps do not invade neighborhoods supplied with telephones.

TRADE NOTES

THE MANHATTAN ELECTRICAL SUPPLY COMPANY, of New York and Chicago, has issued its Trade Price List "C," which applies to Catalogue No. 14. The new list took effect December 14, 1903, and superceded all previous quotations.

THE NICHOLAS SELECTOR COMPANY, of 210 Main street, Rochester, N. Y., manufactures the Nicholas Telephone Selector for use on party lines. The instrument gives the central office operator complete control of the traffic and makes party line service private. The ordinary type of telephone, wired either in series or bridging, can be used with the selector. No grounds are required, the device operating strictly metallic.

THE MONARCH TELEPHONE COMPANY, 12 and 14 South Clinton street, Chicago, has just issued a brochure illustrating its product in so far as it relates to sub-station apparatus. Each portion of the subscriber's outfit, the transmitter, the receiver, the magneto generator, call bell, hook switch, induction coil and lightning arrester are taken up separately and described in an easily apprehendable manner. For each piece of apparatus several cuts are given that fully exhibit details of construction. The succeeding pages are devoted to descriptions and illustrations of complete telephone sets ready for installation, an extensive line being shown designed for either wet or dry batteries, or for central energy systems. Finally, a code is given whereby orders may be briefly and confidentially transmitted.

THE S. H. COUCH COMPANY of 156 Pearl street, Boston, Mass., has issued a folder which tells about its style No. 12 Common Return Intercommunicating Telephones, which will operate on either local or common battery. The instrument is made up in the usual thorough characteristic style of the company, all connections being soldered. No tacks or staples are used in its wiring, all wires being laced. Where the wiring between instruments is to be exposed an iron frame is associated with the telephone which holds the backboard away from the wall, allowing ample room for the wiring. Four screws support the telephone in its position. Another leaflet describes the Workwell Telephones, which are designed for local residence and

business communication. A pair of these instruments sell for seven and a half dollars. The company willingly will send its descriptive matter to any one interested.

THE ELMORE-FOWLER-JACOBS COMPANY, Chicago and Washburn, Ill., and Milwaukee, Wis., is sending out a booklet containing a thrilling murder story, entitled "The Testimony of a Telephone Pole," by Floretta G. Elmore. On the cover is a blood-red print of a human hand, one finger of which is missing. The plot is this: A rich business man is murdered in his home during the absence of the entire family, with the exception of his son. All the circumstances point to the son as the murderer, as he had a quarrel with the father the day the murder was committed. A young lawyer is in love with the murdered man's daughter, endeavors to clear the son, as he believes him innocent. He stumbles on a clue in the shape of a bloody hand-print on telephone pole and traces the commitment of the deed to an elder relative of the bereaved family, who, in the event of the death of the murdered man and his son, would come in under the will for half of the estate for his services as executor. Of course, all ends well with the freeing of the son, and the happy pair are left on the gangplank of a steamer for Europe.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION—Wanted in an exchange of not over 200 to 250 subscribers, in Missouri preferred, by a telephone man with a technical education. Address, Box 123, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 123

\$AVE A DOLLAR OR \$0.—Toll Tickets for Independent Companies. Five thousand, 3 colors, prepaid, \$2.50, cash with order. THE AMERICAN TELEPHONE JOURNAL knows we are O. K. Write for samples; also figures on large quantities. GILDART BROS., Albion, Mich. 112

POSITION—Wanted by telephone man with eight years' experience with Bell and Independent companies. Best of references from present and former employers regarding work and character. 26 years of age; married; strictly temperate. Address Box 120, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 120

POSITION.—A first-class construction man with thirteen (13) years' experience in telephone (both Independent and Bell) and electric light work, desires connection with a telephone company in its construction department. Address, Box 99, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 99

WANTED.—Man and wife to take charge of Telephone Exchange of 100 telephones. State salary wanted. Office with rooms. Address NEW MADRID COUNTY TELEPHONE COMPANY, New Madrid, Mo. 121

INVESTOR wanted to furnish necessary capital for developing good paying telephone property to be managed by an experienced telephone engineer. Will accept nominal salary and equity in plants for services. Address Box 73, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 73

WANTED—Competent salesman to take care of a complete line of telephone and switchboard apparatus. Only high-grade men with references need apply. Must be thoroughly familiar with the trade. State salary or commission with application. Address, Box 122, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York Cit. 122

AFTER YOUR ANNUAL MEETING

You will know just what extensions are in order for the year.
Wouldn't it be a good plan to figure out your pole needs and get prices? It's our experience that prices are usually lower now than in the spring.
At any rate they're no higher, and we can take better care of you now.
Can't we hear from you?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Empire Building.**

"From the Stamp to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

Idaho Cedar Poles

LONG LENGTHS A SPECIALTY

Large
Stocks

Yards { IDAHO
MONTANA

Low
Prices

We also handle MICHIGAN CEDAR POLES

Write for prices.

The Western Lumber & Pole Co.

Main Office, Iron Building, DENVER, COLO.

The Valentine-Clark Co.

*Begin to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

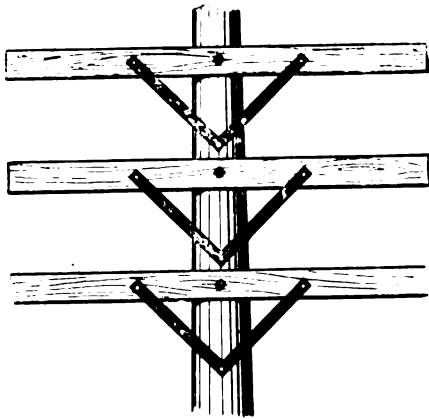
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

A cross arm brace doesn't seem like much of a thing to make but we take as much pride in making an arm brace well as a watchmaker does a watch. We make lots of 'em, therefore can save you money. We have our own plant, do it all ourselves. Write us for prices.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

PRODUCERS NOT JOBBERS

CEDAR POLES

**LOWEST PRICES
IN CARLOAD LOTS**

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 S. GREEN ST. CHICAGO.

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

TIES { YELLOW PINE STOCK,
100,000 6" x 8" x 8 FEET,
Chestnut and Oak, large
stock, standard sizes.

POLES { (Southern White Cedar) long
leaf Yellow Pine, octagonal
and square, Chestnut and
Cypress.

**YELLOW PINE CROSS ARMS,
PINS AND BRACKETS.**

Manufactured by
EGGLESTON LUMBER CO.,
29 Broadway, NEW YORK.

Prompt deliveries from stock, New York
city yard, or direct from mills.

The Morse
Cedar
Co.

**CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.**

Saginaw,
Mich.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK



Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND

Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet.

74 CORTLANDT STREET,

NEW YORK CITY

We Make
a Specialty
of
Telephone
Poles.

POLES

POLES
YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.



J. W. Middleton & Co.
PUBLISHERS OF
THE INTR-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificate, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets
Toll Station Journals
Toll Station Ledgers
Monthly Check Reports
Receipts for Toll Service
Receipts for Exchange
Service
Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

PLATINUM

SHEET and WIRE for all purposes and all shapes in any quantity.

Special Rates for Refining and Reworking Platinum or anything that contains Platinum. Highest Prices Paid for Scrap Platinum.

CROSELMIRE & ACKOR,

Manufacturers and Importers of Platinum of all kinds.
Factory and Main Office, NEWARK, N. J., 42 Walnut St. N. Y. OFFICE, 10 E. 23d St., Room 8.

To Uppor Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,
CHICAGO, ILL.

Tell the Advertiser you saw his
announcement in

**The American
Telephone Journal.**

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR** " " "

Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg., CHICAGO, ILL.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltameters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape,
THE OKONITE CO., Ltd.

WILLARD L. CANDLER, } Managers
E. DURANT CHESLER, }

Manson Tape, Candeo Weather-Proof Wire

SOLE MANUFACTURERS
263 BROADWAY, NEW YORK

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work
Wire Rope and Wire Strand
IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Insulated Electrical Wires and Cables



Bare Steel and Copper Telephone Wire

John A. Roebling's Sons Co.

TRENTON, N. J.

Agencies and Branches

NEW YORK	CHICAGO	CLEVELAND
SAN FRANCISCO	PHILADELPHIA	ATLANTA

Index of the Technical Press

INDEX DE LA PRESSE TECHNIQUE

Index der Technischen Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal Articles published by the Engineering Press of the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

All the big Companies use them!

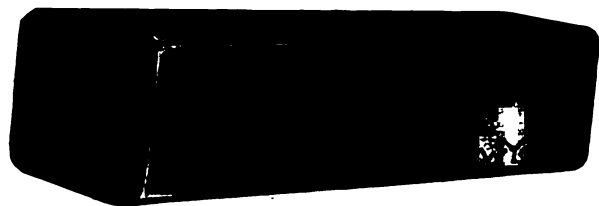


ENAMELED IRON TELEPHONE SIGNS

Shall we quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.





*Large Factories in East and West.
Moderate Prices. Prompt Deliveries.*

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S
(Patent)

**CONNECTORS
AND
TERMINALS**

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,
KANSAS CITY, MO.

You Will Find It Pays To Test



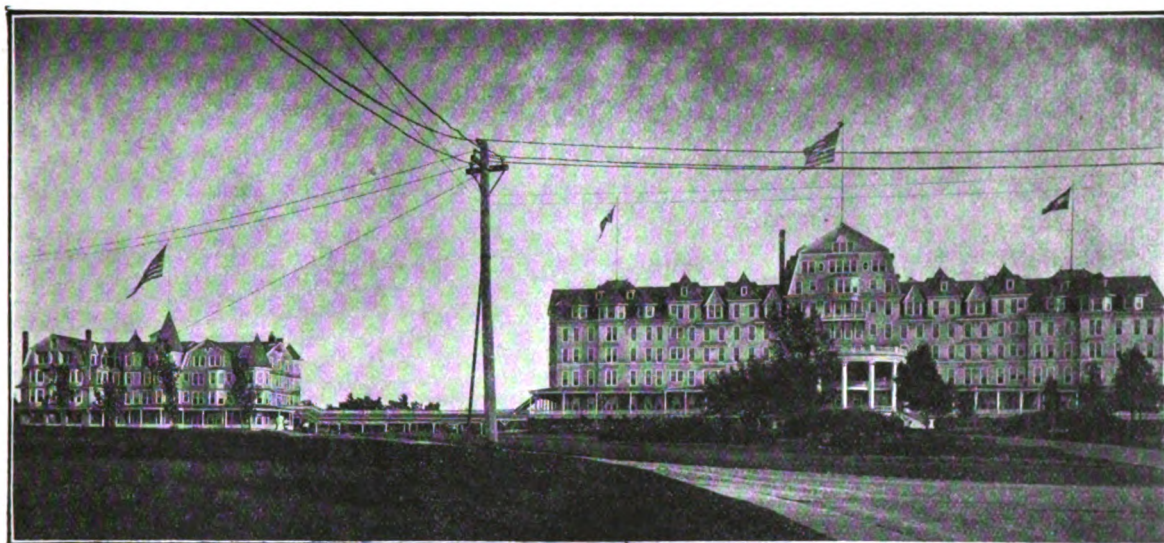
your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

*Aside from disfiguring the view of public and private buildings, **OVER-HEAD** electric systems are dangerous to life and property.*



A FINE LANDSCAPE SPOILED.

*The use of BITUMINIZED FIBER CONDUIT makes **UNDERGROUND** systems practical for electric light, power, telegraph and telephone lines. It is water, gas and electrolysis proof. Easily laid and maintained. The only conduit sold with a guarantee against electrolytic action.*

An illustrated booklet free.

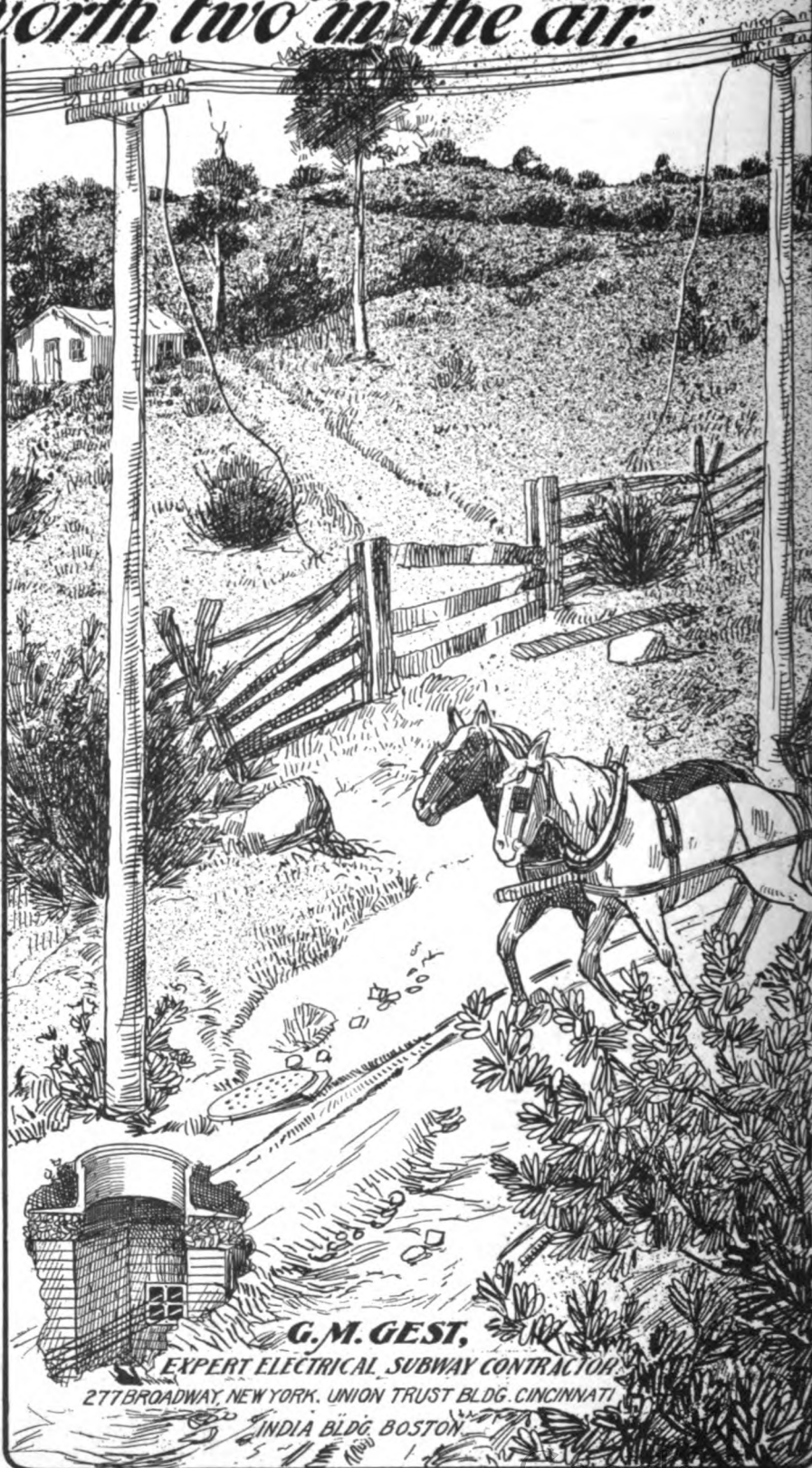
American Conduit Company

170 Broadway,
NEW YORK.

822 Manhattan Building,
CHICAGO.

336 Macy Street,
LOS ANGELES.

*If a bird in the hand is worth two
in the bush, Then one
wire underground is
worth two in the air.*



G. M. GEST,

EXPERT ELECTRICAL SUBWAY CONTRACTOR

277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI

INDIA BLDG. BOSTON

==USERS OF==
“CAMP DUCT”

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

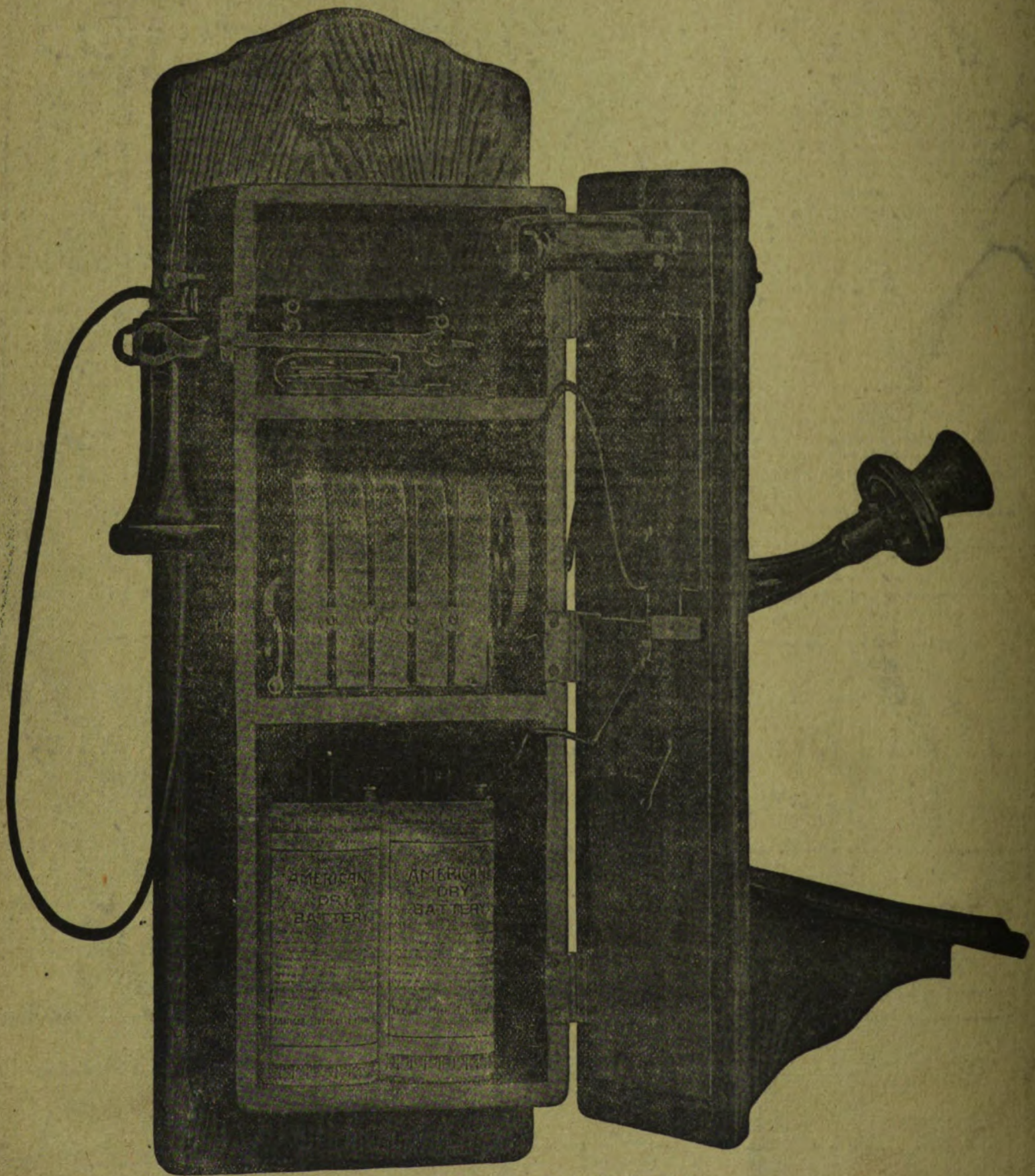
Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

WORTHY OF THE NAME



No. 36 SAMSON



AMERICAN ELECTRIC TELEPHONE COMPANY,
CHICAGO, U. S. A.



THE AMERICAN TELEPHONE JOURNAL

52 for \$1.00

**LESSONS IN PRACTICAL AND SCIENTIFIC
TELEPHONE ENGINEERING**

I want fifty-two more lessons in Practical and Scientific "Telephone Engineering." For this you will find enclosed my renewal to the **best** telephone paper published—**The American Telephone Journal.**

FRANK M. WELCH,
Telephone and Electrical Constructor,
MARTINSVILLE, IND.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by **WILLIAM HENRY McDONOUGH**

Volume 9 NEW YORK—JANUARY 16, 1904—CHICAGO Number 3

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

IDENTIFICATION OF CABLE CONDUCTORS.....By Chas. Amber.
ARRANGEMENT OF TELEPHONE EXCHANGE POWER APPARATUS.....By B. C. Groh.
THE EFFICIENCY OF TELEPHONE CABLES WITH CONTINUOUSLY DISTRIBUTED SELF INDUCTION
By "Our Berlin Correspondent."
NORTHWESTERN CEDARMEN'S ASSOCIATION CONVENTION. WHAT LIGHTNING REALLY IS.
THE THREATENED MIDDLE WEST TELEPHONE WAR.

The Operating Field:

POST OFFICE DISCRIMINATION AGAINST INDEPENDENT TELEPHONES MAKES TROUBLE.
THE TELEPHONE PROBLEM AT EVANSVILLE, IND. UNITED STATES COMPANY TO BUILD.
NEW EQUIPMENT WORKING AT GRAND RAPIDS. KANSAS CITY EXCHANGE OPENED.
PENINSULAR COMPANY RELIEVED FROM SHARING EARNINGS AN EDUCATION FOR SEVENTY CENTS.
WITH CITY. MEET IN ILLINOIS TO ORGANIZE ASSOCIATION.
ANNUAL MEETING OF ROME, N. Y. COMPANY. NEBRASKA ASSOCIATION MEETING.
THE BUFFALO DISTRICT DIRECTORY. THE TELEPHONE IN THE COURTS.

QUERIES. THE EDITOR'S PAGE. PATENTS.
THE WEEK'S MESSAGES. TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 48.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

“Satisfactory business” in any line is the easiest method for making money and explains why we make it our strong play.

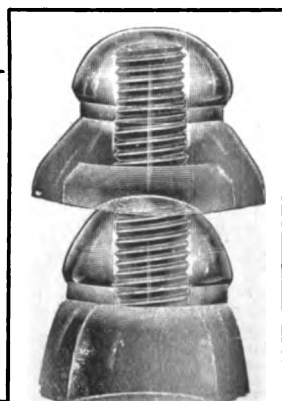
The more satisfactory the business relations with the customer the less labor, expense and advertising to get the business to follow. The editor of the American Telephone Journal made to us the statement that an “ad” in his paper would be a good investment, but he wouldn’t have dared the assertion unless he knew “our methods” would help him out by satisfying the customer and continuing the business. How would the Editor come out if we were one of those “bad deal” people?

Satisfactory goods at satisfactory prices sold with satisfactory methods make a satisfactory business. Catalogue upon request.

ELECTRIC APPLIANCE COMPANY, CHICAGO

THE STANDARD “HEMINGRAY”

ALL WITH THE “PATENT DRIP PETTICOATS.”



Two-Piece Transposition



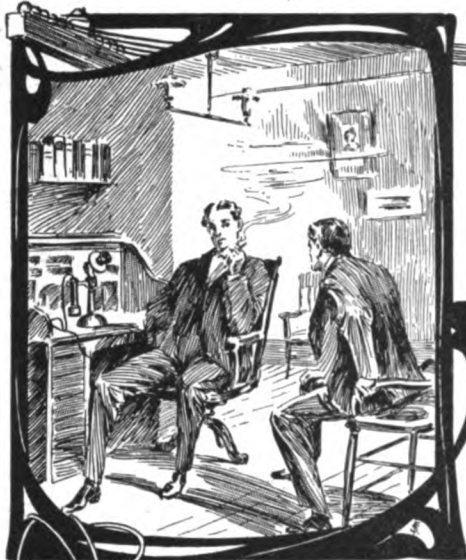
THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

Factory, Muncie, Ind.

ESTABLISHED 1848.

Digitized by Google



INCREASE YOUR INCOME

BY INSTALLING
**STROMBERG-
CARLSON**



Intercommunicating Systems

IN COMMERCIAL HOUSES, FACTORIES, Etc., with Trunk Lines to Your Exchange.

The Twin City Tel. Co., Minneapolis, Minn., Rochester Tel. Co., Rochester, N. Y., Independent Tel. Co., Seattle, Wash., and many others have installed over 100 of these systems in their respective cities. If it pays the larger companies why not the smaller ones in the cities of say 3000 inhabitants and upwards?

WE ARE THE PIONEERS IN THE MANUFACTURE OF THIS TYPE OF APPARATUS.

A cheap telephone is about the most extravagant thing ever installed in a factory. There are telephones being sold for this work that are nothing more than toys.

We manufacture our own instruments from the raw materials. We use the same grade of transmitters and receivers as on our regular telephones. This makes the cost of maintenance almost nothing.

The illustrations show our standard wall and desk type instruments. We can furnish microtelephones instead of desk sets if desired. Write for Booklet 25-B.



**STROMBERG-
CARLSON
TEL. MFG. CO.**

Gen'l & Eastern Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.



THE PENDENT TELEPHONE

W
R
I
T
E
U
S

A
S
K
F
O
R
I
T



COSTS NO MORE THAN
THE ORDINARY DESK
OR WALL PHONE

THE VOUGHT-BERGER COMPANY

Telephones, Switchboards and Appliances

LA CROSSE, WISCONSIN

"The memory of quality
lasts long after price has
been forgotten."

CN 153



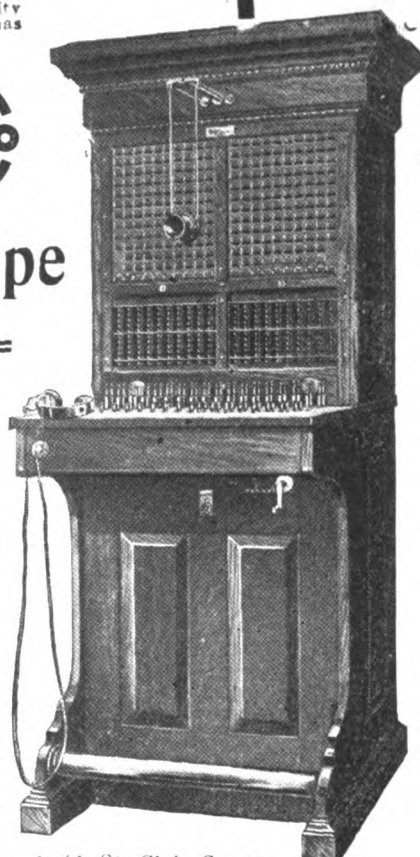
Unit Type Switch- boards

They Grow
As You Need Them

Write for Catalog

THE
NORTH
ELECTRIC
COMPANY

Cleveland, O., U.S.A.—156-166 St. Clair Street



No. 12 Telephone for Interior Systems

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

*Send us a
trial order*

Don't fail to send for bulletin 6, describing No. 12 Telephone.

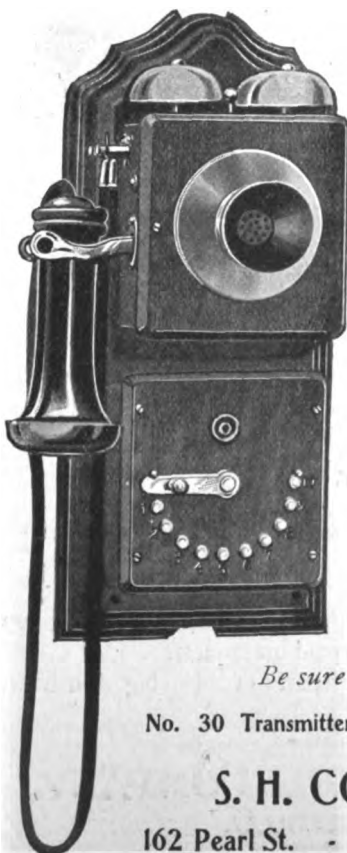
We make a lot of good things.

Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

S. H. COUCH CO.

162 Pearl St. - BOSTON, MASS.



"INTERNATIONAL" Telephones and Switchboards

Should be given due consideration before you place orders for

1904

The new type

Mechanical Self-Restoring Drop Board

A PERFECT APPARATUS

Sample parts, descriptive matter and quotations on request.

International Telephone
Manufacturing Company

CHICAGO, ILLINOIS



NEW



A LAMP SIGNAL BOARD FOR MAGNETO WORK

Signals Automatically restored, Lamp Supervision upon the Cords, Simple in Construction---A revelation in Switchboards for magneto exchanges. Write for price and description.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



Blaine Land Anchor

"You drive the rod through the ground"

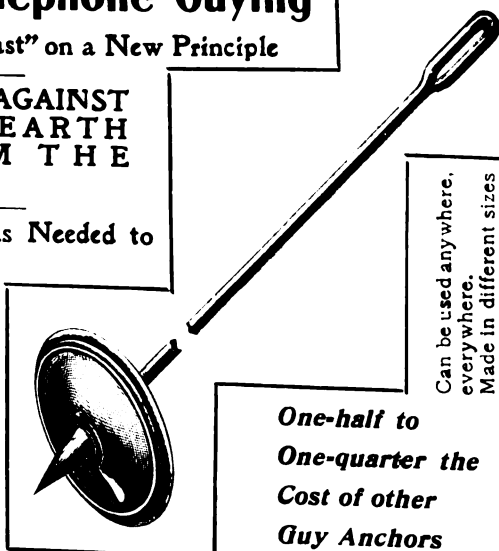
For Telephone Guying

"Hold Fast" on a New Principle

PULLS AGAINST
SOLID EARTH
FROM THE
START

No Tools Needed to
Install it.

Cheap
Portable
Easy to
Install
Instantly
and
Eternally
Firm



Can be used anywhere,
everywhere.
Made in different sizes

One-half to
One-quarter the
Cost of other
Guy Anchors

You dig the hole, drive the rod through the ground till the point enters the bottom of the hole, then you attach the Land Plate. See how simple?

Write for Descriptive Circulars, Prices and Full Information

—MANUFACTURED BY—

The Attica Foundry & Machine Co., Attica, Ohio

TELEPHONE SUPPLIES



Bulletin 233, showing Telephone Specialties is now ready and will be sent prepaid on request.

This Bulletin is now part of our big illustrated catalog.

THE F. BISSELL COMPANY.
TOLEDO, O.

RECENT New Apparatus of other manufacturers is conforming more and more to **KELLOGG STANDARD.**

Some manufacturers are entirely remodelling their telephone apparatus into what careful examination shows to be mere imitation of the **KELLOGG STANDARD APPARATUS.**

We are constantly improving and adding attractive features to our standard, but **FUNDAMENTAL CHANGES** in apparatus are only or those manufacturers whose product differs from Kellogg forms and Kellogg successes.

Examine for yourself!

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Green and Congress Streets, Chicago

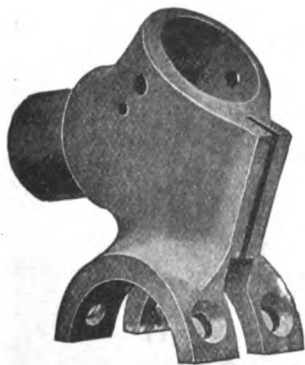
346 BROADWAY,	...	...	...	NEW YORK.
ELECTRIC BUILDING,	...	...	...	CLEVELAND.
KEYSTONE TELEPHONE BUILDING,				PHILADELPHIA.



MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.
14 So. Clinton Street CHICAGO, ILL.

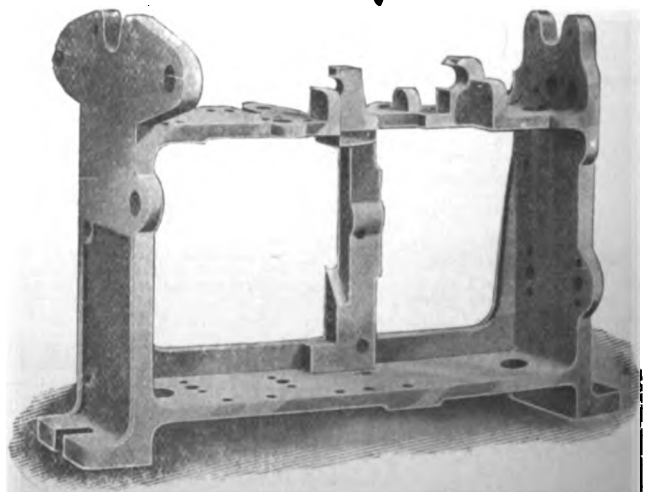


The Things Here Shown Are Cast Finished.



That means that they are ready to assemble without any further work being put on them. The holes, notches, lugs, and everything else is done when the castings come from the mold. These castings do away with all filing, boring, reaming, countersinking, grinding or finishing in any way. Not only are they better than similar pieces machined from rough castings, but the cost is much less. A little looking into this thing might develop the fact that you could make good use of these castings. A sample casting and descriptive book sent on request.

Franklin Manufacturing Company,
202 S. GEDDES ST.
Syracuse, N. Y., U. S. A.



"READY" TELEPHONE MEMORANDUM PAD HOLDERS



Style No. 1

Patent Pending

Can be furnished to fasten on telephone or on the wall as shown in illustration. Adjustable to any angle, each Holder has straight edge for tearing off memorandums.

NET PRICE EACH \$1.00

MANUFACTURED BY

THE W. G. NAGEL ELECTRIC CO., Toledo, O.

ADVERTISERS' DIRECTORY

American Conduit Co. 41	Dickey Clay Mfg. Co., W. S. 40	Kellogg Switchboard & Supply Co., 7, 34	Roebling's, John A., Sons Co. 39
American Electric Teleph. Co. 44	Eccleston Lumber Co. 35	Klein, Mathias & Sons. 35	Sand Point Cedar Co. 32
Am. School of Correspondence. 11	Electric Appliance Co. 3, 10	Leslie, A. C. & Co. 11	Scoville Mfg. Co. 2
American Vitrifed Conduit Co. 43	Elkin Machine Co. 35	Lindsley Brothers Co. 32	Shaw-Walker Co. 12
Attica Foundry & Machine Co. 6	Ericsson Telephone Co. 10	McIntire, C., Co. 40	Standard Underground Cable Co. 14
Automatic Electric Co. 9	Fahnestock Transmitter Co. 35	Malthby Lumber Co. 31	Stanton, L. W. 30
Barr, W. J., Mfg. Co. 11	Field, C. J. 49	Michigan Cedar Co. 35	Sterling, W. C. & Son. 35
Beidler, Francis & Co. 33	Fowler, John H. 34	Middleton, J. W. & Co. 35	Sterling Electric Co. 6
Bissell Co., The F. 6	Franklin Mfg. Co. 8	Miller Anchor Co. 35	Stromberg-Carlson Telephone Mfg. Co. 4
Butterfield, J. F. 36	Franklin Rolling Mill & Fdy. Co. 33	Monarch Telephone Mfg Co. 8	Swedish-American Tel. Co. 14
Camp, The H. B. Co. 43	Gest, G. M. 42	Morse Cedar Co. 35	Telephone Printing Co. 35
Central Mfg. Co. 37	Hemingray Glass Co. 3	Nagel, W. G., Electric Co. 9	Townsend Cedar & Supply Co. 34
Central Telephone & Electric Co. 37	Holtzer-Cabot Electric Co. 3	National Wire Corporation. 39	Valentine Clark Co. 32
Chicago Writing Machine Co. 13	Huebel, C. J. & Co. 31	New Haven Novelty Machine Co. 2	Vought-Berger Co. 5
Cohn & Bock. 35	Hyde, W. H. & Co. 36	North Electric Co. 5	Wanted, Situations, etc. 48
Columbia Electric Co. 14	Imperial Finance & Cons. Co. 36	Nungesser Electric Battery Co. 3	Weston Electrical Instrument Co. 36
Connecticut Teleph. & Electric Co. 11	Ingram-Richardson Mfg. Co. 12	Okonite Company 36	Wisconsin Timber & Land Co. 35
Cook, Frank B. 5	Index of the Technical Press. 12	Pacific Coast Fole Co. 32	Worcester, C. H., Co. 31
Couch, S. H. Co. 14	Inland Steel Co. 34	Pignolet, L. M. 37	Yesbera Mfg. Co. 12
Craghead Engineering Co. 14	International Telephone Mfg. Co. 5	Pittsburg & Lake Superior Iron Co. 31	
Crosblmire & Ackor. 36		Pittsburg Sewer Pipe & Conduit Co. 40	
Crumb, W. H. Co. 36			
Cunningham Iron Co. 40			
ANCHORS.	Bissell Co., The F., Toledo, O.	CABLE SLEEVES.	Nagel, W. G., Electric Co., Toledo, O.
Attica Foundry & Machine Co., Attica, O.	Kellogg Switchboard & Supply Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	New Haven Novelty Machine Co., New Haven, Conn.
BATTERIES.	Nagel, W. G., Electric Co., Toledo, O.	National Wire Corporation, New Haven, Conn.	Okonite Co., New York.
Electric Appliance Co., Chicago, Ill.	Roebing's Sons Co., John A., Trenton, N. J.	Standard Underground Cable Co., Pittsburgh, Pa.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Mungesser Electric Battery Co., Cleveland, O.			
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.			
BONDS.			
J. W. Middleton & Co., Chicago, Ill.			
BRASS.			
Scoville Mfg. Co., Chicago, Ill.			
BOOTHES.			
Yesbera Mfg. Co., Toledo, O.			
CABLES.			
American Electric Tel. Co., Chicago, Ill.			

WANT AND FOR SALE ADVERTISEMENTS, PAGE 48.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

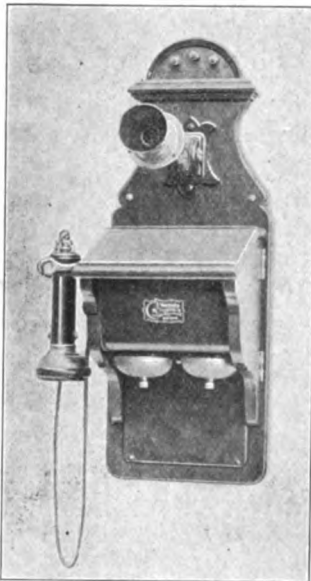


If you don't give your subscribers
AUTOMATIC TELEPHONE SERVICE you
don't give them the best.

Write for our catalogue.

Automatic Electric Company, Chicago, U. S. A.

Cheap Maintenance



High quality, durability and efficiency are what characterize the Ericsson Telephones.

We are in the market to supply you with switchboards—telephones (for magneto or common battery) and telephone parts.

Write to-day for catalog.

Ericsson Telephone Co.
INDEPENDENT

296 Broadway,

New York, New York.

ADVERTISERS' DIRECTORY—Continued.

- | | |
|-------------------------------------------------|----------------------------------------------------|
| Hemingray Glass Co., Covington, Ky. | CROSS ARMS. |
| Inland Steel Co., Chicago, Ill. | American Electric Tel. Co., Chicago, Ill. |
| Kellogg Switchboard & Supply Co., Chicago, Ill. | Bissell Co., The F., Toledo, O. |
| Klein & Sons, Mathias, Chicago, Ill. | Central Mfg. Co., Chattanooga, Tenn. |
| Leslie, A. C., & Co., Montreal, Can. | Cohn & Bock, Princess Anne, Md. |
| Nagel, W. G., Electric Co., Toledo, O. | Creaghead Engineering Co., Cincinnati, O. |
| New Haven Novelty Mch. Co., New Haven, Conn. | Nagel, W. G., Electric Co., Toledo, O. |
| Scoville Mfg. Co., Chicago, Ill. | Townsend Cedar & Supply Co., Chicago, Ill. |
| Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. | ENGINEERS AND CONTRACTORS. |
| CONSTRUCTION TOOLS. | Butterfield, J. F., Chicago, Ill. |
| American Electric Tel. Co., Chicago, Ill. | Crumb, W. H., & Co., Chicago, Ill. |
| Bissell Co., The F., Toledo, O. | Imperial Finance & Construction Co., Chicago, Ill. |
| Electric Appliance Co., Chicago, Ill. | Stanton, L. W., Cleveland, O. |
| Farr Tel. & Const. Supply Co., Chicago, Ill. | FILES. |
| Kellogg Switchboard & Supply Co., Chicago, Ill. | Shaw-Walker Co., Muskegon, Mich. |
| Klein & Sons, Mathias, Chicago, Ill. | FUSES. |
| Nagel, W. G., Electric Co., Toledo, O. | Cook, Frank B., Chicago, Ill. |
| North Electric Co., Cleveland, O. | Sterling Electric Co., Lafayette, Ind. |
| Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. | GERMAN SILVER. |
| COPPER. | Scovill Mfg. Co., Chicago, Ill. |
| Scovill Mfg. Co., Chicago, Ill. | GUY ANCHORS. |
| CORPORATION RECORD BOOKS | Attica Foundry & Machine Co., Attica, O. |
| Middleton & Co., J. W., Chicago, Ill. | Bissell Co., The F., Toledo, O. |
| CORRESPONDENCE SCHOOL | Miller Anchor Co., Norwalk, O. |
| American School of Correspondence Chicago, Ill. | Nagel, W. G., Electric Co., Toledo, O. |
| CROSS ARM BRACES. | INSULATING MATERIAL. |
| Inland Steel Co., Chicago, Ill. | Bissell Co., The F., Toledo, O. |
| | Nagel, W. G., Electric Co., Toledo, O. |
| | Okonite Co., New York. |
| | Standard Underground Cable Co., Pittsburg, Pa. |

CONTINUED ON PAGE 37.

1900 Dry Batteries are "easy money"; once used, used again, once sold, stay sold, and that means easy money and that explains why the price is low.

The smaller the number "scrapped" on account of defects, the less the *factory cost*. The fewer complaints, the fewer to come back to be replaced, the less the *selling cost*. The better the battery, the guaranteed satisfactory service, the less effort, expense and cost of advertising to sell the next batch.

Easiest proposition to figure—the best battery and the best price—it's easier to figure after you try a barrel. The most satisfactory battery made and the lowest in price when figured (price x service=) comparatively with the cheapest battery ever offered.

ELECTRIC APPLIANCE COMPANY, CHICAGO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND

A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

10 YEARS

EXPERIENCE IN THE MANUFACTURE OF

Telephone Apparatus!

SHOULD WE NOT KNOW HOW?

Complete Equipment for

**Village Exchanges,
Country Party Lines,
Toll Lines,
Central-Energy Phones,
Private Plants,
Intercommunicating Phones.**

New Catalog No. 7J sent on request. New prices.

No Better Transmitter can
be made than the new

"CONN" SOLID BACK

Send for sample on trial.

We have moved into our new factory, which is the
largest and finest equipped telephone plant in the East.

Connecticut Telo. & Elec. Co.

MERIDEN, CONN.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND

A

256

Page

Book on

Electricity

70
CENTS

by

Express

(Prepaid)

Page 7 x 10 in.
Bound in green buckram.
Over 100 illustrations.

MANY people believe Electricity cannot be taught outside the
class room.

To demonstrate the standard, scope and methods of our
instruction we have bound up four representative text books in
our Electrical Engineering course in a handsome linen cover under
the title of

PRACTICAL LESSONS IN ELECTRICITY

and will send one copy for **seventy cents** (the cost of binding and
express charges) to every reader of The American Telephone Jour-
nal sending us the names of two friends interested in Electrical
Engineering. (Address Room 9G).

The book is easily worth \$3.00 and we make this liberal
offer because we know that an inspection of our text books
will be convincing evidence of the practical value of our
instruction.

The subjects embraced are:

STORAGE BATTERIES (prepared especially for home study by
Prof. F. B. Crocker, Columbia University): Types; General Principles;
Chemical Action; Data Sheets; Edison Storage Battery; Management; Electro-
lyte; Cadmium Test; Charging; Efficiency; Troubles and Remedies; Testing;
Portable Batteries for Automobiles and Boats; etc.

ELECTRIC WIRING (prepared by H. C. Cushing, Jr., author of
"Standard Wiring"): Dynamo Installation; The Switch Board; Lightning
Arresters; Motor Installation; Tables; Transformers; Three-Wire System; Poles
and Pole Setting; Inside Wiring; Arc Light Wiring; Conduit Work; Fixture
Wiring; Cut-outs; Switches; Distribution of Light; Arc and Incandescent
Systems; Fuses; Inspection; etc.

ELECTRIC CURRENT (by L. K. Sager, S. B.): Volt, Ampere; Ohm;
Resistance; Conductivity; Tables; Circuits, Grouping of Cells; Quantity;
Energy; Power; Joule; Coulomb; Joule; Watt; etc.

ELEMENTS OF ELECTRICITY (by L. K. Sager, S. B.): Magnets;
Experiments with Magnets; Magnetizing Steel; Conductors and Insulation;
Electric Machine; Leyden Jar; Voltaic Cell; Types of Cells; Electro-magnets;
Induction Coil; Electrolysis; Electrotyping and Electro-Plating; The Tele-
phone; The Telegraph; Sounder, Alphabet, Key, Battery, Relay, etc.

Illustrated 200 page quarterly Bulletin, giving full outlines of
the following courses will be sent free on request.

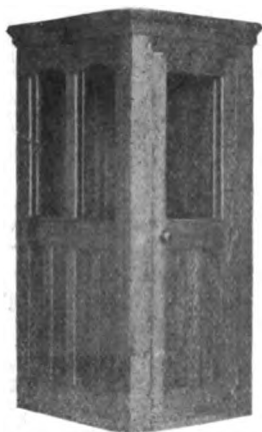
Electrical Engineering,	Civil Engineering.
Central Station Work,	Structural Engineer's.
Wiring.	Municipal Engineer's.
Electrical Railways,	Railroad Engineer's.
Mechanical Engineering	Hydraulics.
Shop Practice.	Architecture.
Tool Makers' Course.	Architectural Draw'g.
Stationary Engineering.	Structural Design.
Firemen's Course.(For License)	Carpenters' Course.
Engineers' Course.(For License)	Contractors' Course.
Marine Engineering.	Mechanical Draw'g.
Locomotive Engineering.	Perspective Draw'g.
Sheet Metal P't'n Draft'g.	Pen & Ink Render'g.
Cotton Manfg. Course.	Mathematics.
Knitting Course.	Navigation.
Textile Design.	Telephony.
Woolen & Worsted Goods.	Telegraphy.
Woolen & Worsted Finish'g.	Tinsmithing.
Heating, Ventilation & Refrigeration.	Chemistry & Dyeing.
Plumbing.	College Preparatory Courses.
Surveying.	

American School of Correspondence

at
Armour Institute of Technology

CHICAGO, ILL.

Mention American Telephone Journal.



Booths Are Money Makers

If they are right. Mine are. That's the reason the Keystone Telephone Company bought 400 from me. It was the largest booth order ever placed and naturally went to

YESBERA MFG. CO.,

**THE WORLD'S LEADERS IN TELEPHONE BOOTHS
TOLEDO, OHIO.**

Write for Beautiful Catalogue and Prices.



All the big Companies
use them!

ENAMELED IRON TELEPHONE SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.



OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,
116 NASSAU ST. CITY OF NEW YORK

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

American Telephone Practice

By KEMPSTER B. MILLER, M. E.

518 large pages, profusely illustrated with 380
diagrams and cuts of apparatus

\$3.00

A book for the telephone man. It is an encyclopedia of useful information concerning telephony. It gives complete specifications, enabling you to intelligently order apparatus from manufacturers, and to properly supervise the installation of an exchange, large or small. It describes in simple language the theory and practice of modern telephony, including circuits, mechanical construction and operation of telephones and switchboards. A complete description is given of storage batteries, their care and maintenance; of aerial and underground line construction, and, in fact, all the important matters which telephone men need to know.

Sent Prepaid on Receipt of Price by AMERICAN TELEPHONE JOURNAL

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

THE ADJUSTAPHONE

For the office
For the home

For economy
For durability

For convenience
For appearance



For a service ideal
in every particular

Get the Adjustaphone

*Any System, any
Transmitter, any Receiver*

Telephone Department
Chicago Writing Machine Co.

105 Wendell St., Chicago, Ill.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

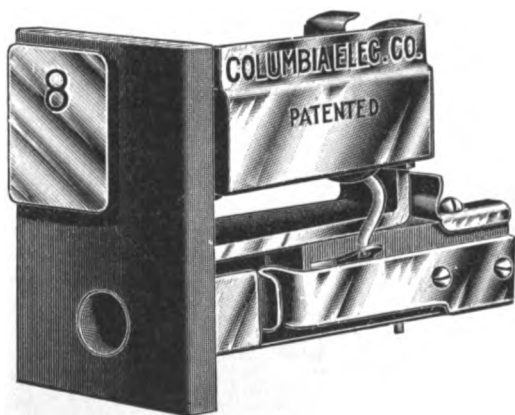


TURN OVER A NEW LEAF.

1904
RING OUT
THE OLD-
RING IN
THE NEW

MAKE A
RESOLUTION
TO USE
SWEDISH-
AMERICAN
APPARATUS
AND YOUR
"TROUBLES"
WILL
VANISH.

SWEDISH-AMERICAN **TELEPHONE COMPANY**
CHICAGO



Columbia Self-Restoring Drop.

WHAT DO YOU THINK!

We can furnish you with a better drop than you have been buying elsewhere, and at a much lower price.

FITS EUREKA BOARD

We manufacture from the raw material, and guarantee every piece we build. We solicit the jobbers' trade and are sure that we can interest you. Write us for anything you may need in the way of switchboard and telephone apparatus. We have more to tell you.

COLUMBIA ELECTRIC CO.

Mention this paper.

Factory and Office at McCORDSVILLE, IND.

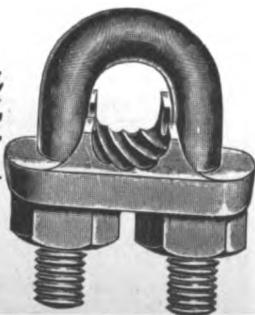
Line Hardware

POLE FITTINGS

CROSS ARMS, BRACES, BOLTS,
LAGS, WASHERS, PINS, STEPS,
MESSENGER HANGERS, GUY RODS.

and All Kinds of Telephone Line Construction Material.

SEND SPECIFICATIONS



The Creaghead Engineering Co.,
CINCINNATI, OHIO.

Telephone Wire



and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,
PITTSBURGH, PA.

BOSTON.

NEW YORK.

PHILADELPHIA.

CHICAGO.

SAN FRANCISCO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JANUARY 16, 1904

NUMBER 3

NORTHWESTERN CEDARMEN'S ASSOCIATION CONVENTION

THE eighth annual convention of the Northwestern Cedarmen's Association was held at the Auditorium Hotel, Chicago, Tuesday afternoon, January 5. This was the first meeting of the association ever held in Chicago, and the second ever held outside the cedar producing regions of the north. The business session was taken up mainly in a discussion of the condition of the cedar trade, which reports from members indicated to be fairly prosperous, with the exception of the cedar shingle industry, which has been adversely affected by the competition of low-priced red cedar shingles from Washington. No change was made in the schedule of prices, except that the price on shingles was made to conform more closely to their present market value than the former list indicated. No action was taken in reference to the price of poles.

In the absence of President R. H. Downing, the meeting was called to order by Treasurer H. W. Reade. M. K. Bissell, of Escanaba, Mich., was elected chairman. The minutes of the last convention, held at Minneapolis, January 12, 1903, were read by the secretary, F. H. Gilman, and approved.

The secretary then read the address of President Downing. The letter reviewed the progress made by the association and compared the chaotic condition which prevailed in the white cedar industry previous to the organization with the present satisfactory condition, which had been brought about by intelligent co-operation. Formerly there was no uniformity in prices or weights, no specifications as to quality or kind; each man was a law unto himself and wanted to be to his competitor. All this has been changed. The delivered lists based on shipment from one central point equalize all prices; the rate classification books issued by the association, from a financial standpoint, are alone worth all it costs for membership and dues. The price lists are compiled by committees who are or should be experts in their line and in closest touch with the market, and although there have been expressions of opinion to the contrary, no list has ever been issued that was not an honest opinion of the committee as to the values that could be obtained at the time. This is all the association promises to do, and none can truthfully say it has not fulfilled its promises.

*The president recommended that during the coming year there be a more united effort to maintain the price of a product which has never known an inflated value. His remarks, while directed chiefly to those who handle posts and shingles,

were directed with equal force to members engaged in the pole business. In conclusion, he recommended that frequent statements be issued covering the production and stocks on hand of posts, poles and white cedar shingles, for with this information before it the association could more intelligently formulate a just schedule of prices.

The secretary in his report reviewed the condition of the white cedar market during the past year, and called attention to the growing competition of the Washington shingle manufacturers. He reported that during the year the association had maintained its membership at seventy-three, having both gained and lost six members.

Treasurer H. W. Reade reported total receipts of \$779.76 and disbursements of \$768.70.

The nominating committee recommended the following officers for the ensuing year and their report was unanimously adopted:

President—H. W. Reade, Escanaba, Mich.

Vice-President — Daniel MacGillis, Milwaukee, Wis.

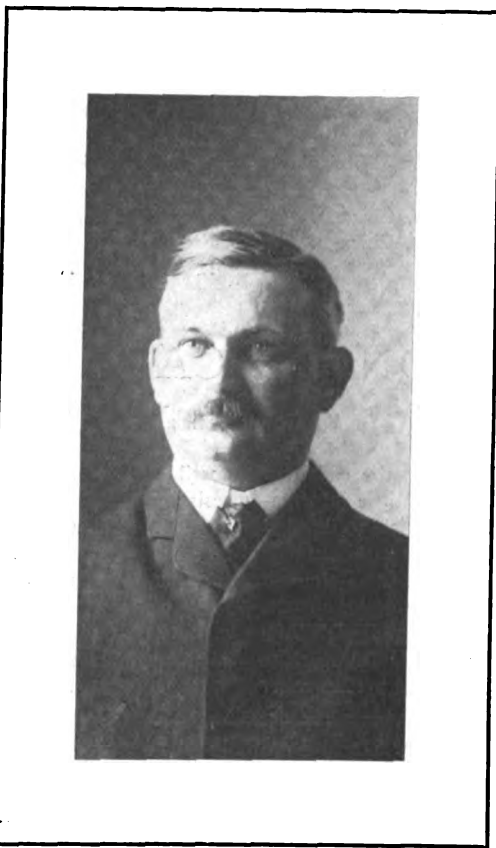
Directors—E. H. Valentine, Chicago; Ole Erickson, Escanaba; M. H. Coolidge, Minneapolis; F. W. Robinson, Bovee, Mich.

A meeting of the newly elected board of directors followed, at which the resignation of Fred. H. Gilman, who has been secretary of the association for the past three years, was presented and accepted. Mr. Gilman gave as his reason for resigning that he expected to be absent most of the time the coming year on the Pacific coast and would not be able to attend to the duties

of the office. John F. Hayden, of Minneapolis, was elected secretary, and W. B. Thomas, of Manistique, Mich., was elected treasurer for the ensuing year. The secretary was instructed to issue a supplement to the freight classification books, correcting them to date.

At seven o'clock in the evening the members sat down to a banquet at the Union League Club, as guests of the following Chicago concerns: Lindsley Bros. Company, C. H. Worcester Company, Valentine-Clark Company, William Mueller Company, Fulmer, Koestler, Schroeder Company, Francis Beidler & Co., Carney Bros. Company, Raber & Watson, Fowler-Jacobs Company, E. E. Naugle Tie Company, Edward Hines Lumber Company, Perley Lowe & Co., and others.

E. H. Valentine, the dean of the white cedar industry, acted as chairman for the evening, and was unanimously complimented for the witty and interesting manner in which he conducted the



H. W. Reade, Escanaba, Mich., President for the Ensuing Year of the Northwestern Cedarmen's Association.

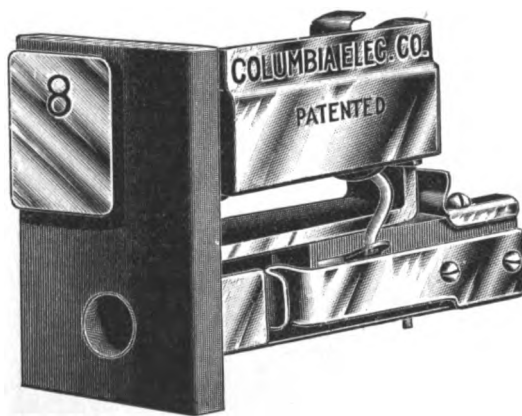
TURN OVER A NEW LEAF.

1904
RING OUT
THE OLD-
RING IN
THE NEW

Total trouble cost 3,783.92

MAKE A RESOLUTION TO USE SWEDISH-AMERICAN APPARATUS AND YOUR "TROUBLES" WILL VANISH.

SWEDISH-AMERICAN TELEPHONE COMPANY
CHICAGO



Columbia Self-Restoring Drop.

WHAT DO YOU THINK!

We can furnish you with a better drop than you have been buying elsewhere, and at a much lower price.

FITS EUREKA BOARD

We manufacture from the raw material, and guarantee every piece we build. We solicit the jobbers' trade and are sure that we can interest you. Write us for anything you may need in the way of switchboard and telephone apparatus. We have more to tell you.

COLUMBIA ELECTRIC CO.

Mention this paper.

Factory and Office at McCORDSVILLE, IND.

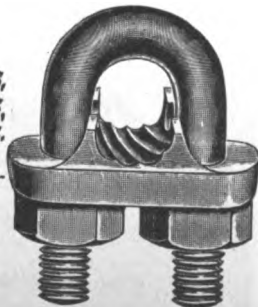
Line Hardware

POLE FITTINGS

CROSS ARMS, BRACES, BOLTS, LAGS, WASHERS, PINS, STEPS, MESSENGER HANGERS, GUY RODS.

and All Kinds of Telephone Line Construction Material.

SEND SPECIFICATIONS



The Creaghead Engineering Co.,
CINCINNATI, OHIO.

Telephone Wire



and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JANUARY 16, 1904

NUMBER 3

NORTHWESTERN CEDARMEN'S ASSOCIATION CONVENTION

THE eighth annual convention of the Northwestern Cedarmen's Association was held at the Auditorium Hotel, Chicago, Tuesday afternoon, January 5. This was the first meeting of the association ever held in Chicago, and the second ever held outside the cedar producing regions of the north. The business session was taken up mainly in a discussion of the condition of the cedar trade, which reports from members indicated to be fairly prosperous, with the exception of the cedar shingle industry, which has been adversely affected by the competition of low-priced red cedar shingles from Washington. No change was made in the schedule of prices, except that the price on shingles was made to conform more closely to their present market value than the former list indicated. No action was taken in reference to the price of poles.

In the absence of President R. H. Downing, the meeting was called to order by Treasurer H. W. Reade. M. K. Bissell, of Escanaba, Mich., was elected chairman. The minutes of the last convention, held at Minneapolis, January 12, 1903, were read by the secretary, F. H. Gilman, and approved.

The secretary then read the address of President Downing. The letter reviewed the progress made by the association and compared the chaotic condition which prevailed in the white cedar industry previous to the organization with the present satisfactory condition, which had been brought about by intelligent co-operation. Formerly there was no uniformity in prices or weights, no specifications as to quality or kind; each man was a law unto himself and wanted to be to his competitor. All this has been changed. The delivered lists based on shipment from one central point equalize all prices; the rate classification books issued by the association, from a financial standpoint, are alone worth all it costs for membership and dues. The price lists are compiled by committees who are or should be experts in their line and in closest touch with the market, and although there have been expressions of opinion to the contrary, no list has ever been issued that was not an honest opinion of the committee as to the values that could be obtained at the time. This is all the association promises to do, and none can truthfully say it has not fulfilled its promises.

The president recommended that during the coming year there be a more united effort to maintain the price of a product which has never known an inflated value. His remarks, while directed chiefly to those who handle posts and shingles,

were directed with equal force to members engaged in the pole business. In conclusion, he recommended that frequent statements be issued covering the production and stocks on hand of posts, poles and white cedar shingles, for with this information before it the association could more intelligently formulate a just schedule of prices.

The secretary in his report reviewed the condition of the white cedar market during the past year, and called attention to the growing competition of the Washington shingle manufacturers. He reported that during the year the association had maintained its membership at seventy-three, having both gained and lost six members.

Treasurer H. W. Reade reported total receipts of \$779.76 and disbursements of \$768.70.

The nominating committee recommended the following officers for the ensuing year and their report was unanimously adopted:

President—H. W. Reade, Escanaba, Mich.

Vice-President — Daniel MacGillis, Milwaukee, Wis.

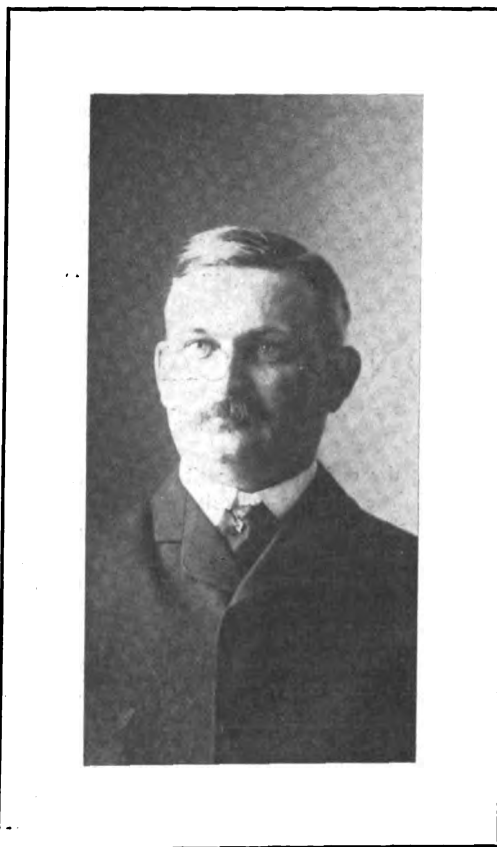
Directors—E. H. Valentine, Chicago; Ole Erickson, Escanaba; M. H. Coolidge, Minneapolis; F. W. Robinson, Bovee, Mich.

A meeting of the newly elected board of directors followed, at which the resignation of Fred. H. Gilman, who has been secretary of the association for the past three years, was presented and accepted. Mr. Gilman gave as his reason for resigning that he expected to be absent most of the time the coming year on the Pacific coast and would not be able to attend to the duties

of the office. John F. Hayden, of Minneapolis, was elected secretary, and W. B. Thomas, of Manistique, Mich., was elected treasurer for the ensuing year. The secretary was instructed to issue a supplement to the freight classification books, correcting them to date.

At seven o'clock in the evening the members sat down to a banquet at the Union League Club, as guests of the following Chicago concerns: Lindsley Bros. Company, C. H. Worcester Company, Valentine-Clark Company, William Mueller Company, Fulmer, Koestler, Schroeder Company, Francis Beidler & Co., Carney Bros. Company, Raber & Watson, Fowler-Jacobs Company, E. E. Naugle Tie Company, Edward Hines Lumber Company, Perley Lowe & Co., and others.

E. H. Valentine, the dean of the white cedar industry, acted as chairman for the evening, and was unanimously complimented for the witty and interesting manner in which he conducted the



H. W. Reade, Escanaba, Mich., President for the Ensuing Year of the Northwestern Cedarmen's Association.

ceremonies. As spokesman for the Chicago contingent he extended a hearty welcome to the visiting members, whom he referred to as "a very sedate crowd of gentlemen." The only previous meeting he had attended was that at Minneapolis last year, but he asserted that in spite of his gray hairs he hoped to attend the meetings for many years to come. The newly elected officers spoke briefly and other members and guests discussed a variety of subjects vital to the white cedar interests.

The retiring secretary, F. H. Gilman, who leaves shortly to represent the *American Lumberman* on the Pacific coast, thanked the members for their many favors and consideration during the three years he had been secretary.

The following were among those present:

G. L. Lindsley, Lindsley Bros. Co., Chicago.
 M. K. Bissell, Erickson & Bissell, Escanaba, Mich.
 Ole Erickson, Erickson & Bissell, Escanaba, Mich.
 A. P. Hopkins, A. P. Hopkins & Co., Escanaba, Mich.
 A. T. Naugle, E. E. Naugle Tie Co., Chicago.
 W. R. Mackenzie, Brittingham & Hixon Lumber Co., Madison, Wis.
 C. J. Huebel, C. J. Huebel Co., Menominee, Mich.
 F. J. Lang, Wisconsin Land & Lumber Co., Hermansville, Mich.
 M. H. Coolidge, M. H. Coolidge Co., Minneapolis, Minn.
 H. W. Reade, Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
 Daniel MacGillis, MacGillis & Gibbs Lumber Co., Milwaukee, Wis.
 J. W. Fulmer, Fulmer, Koestler, Schroeder Co., Chicago.
 D. M. Fulmer, Fulmer, Koestler, Schroeder Co., Chicago.
 T. A. Bruett, Wilbur Lumber Co., Milwaukee.

L. H. Roberts, Paton, Iowa.
 J. A. McDavitt, Cloquet Tie & Post Co., Cloquet, Minn.
 F. W. Werner, Bradley-Watkins Co., Minneapolis, Minn.
 C. H. Worcester, C. H. Worcester Co., Chicago.
 A. Maltby, Maltby Lumber Co., Bay City, Mich.
 George J. Farnsworth, Bay du Noquette Co., Nahama, Mich.
 J. E. Gerich, MacGillis & Gibbs Lumber Co., Milwaukee.
 Frank N. Snell, Milwaukee.
 J. C. King, King & Bartles Lumber Co., Cleveland.
 E. H. Valentine, Valentine & Clark Co., Chicago.
 George Nicholson, Jr., White Marble Lime Co., Manistique, Mich.
 W. B. Thomas, White Marble Lime Co., Manistique, Mich.
 F. W. Robinson, Robinson & Freeman, Bovee, Mich.
 J. K. Wright, Wright Bros., Marinette, Wis.
 W. P. Bowring, C. H. Worcester Co., Chicago.
 T. B. Conover, E. E. Naugle Tie Co., Chicago.
 A. W. Haines, Holt Lumber Co., Oconto, Wis.
 W. G. Wheeler, Rockford, Ill.
 J. H. Fowler, Fowler-Jacobs Co., Chicago.
 J. Jeffrey, William Mueller Co., Chicago.
 F. W. Raber, Raber & Watson, Chicago.
 J. A. Navarre, Lindsley Bros. Co., Chicago.
 E. E. Kaufman, Carney Bros. Co., Chicago.
 W. W. McQueen, Kellogg Switchboard & Supply Co., Escanaba, Mich.
 Hall L. Brooks, Tomahawk, Wis.
 M. Fitzgibbons, Wisconsin Timber & Land Co., Mattoon, Mich.
 J. F. Hayden, *Mississippi Valley Lumberman*.
 Fred. H. Gilman, *American Lumberman*.
 L. E. Clark, *AMERICAN TELEPHONE JOURNAL*.

IDENTIFICATION OF CABLE CONDUCTORS

By CHAS. AMBER.

IT is often desirable to find certain conductors at the end of a cable, or at some splice in it. Text books give little information on the subject, and it is the aim of this article to develop a scheme which can easily be used for this purpose. In the accompanying illustration (Fig. 1) *A* represents what is known as a Chelsea relay. The relay is actuated by the ringing current which causes the armature *A'* to vibrate very rapidly, making and breaking the contact at *B'* between the battery *B*, which is composed of four Fuller cells, and the ground. The other

possible to short circuit the ringing current at the relay. The resistance *R* should be placed as near as possible to the generator leads to avoid a chance of a short circuit in the wiring affecting the ringing apparatus. If a Chelsea relay is not available a very fair substitute may be made from a 1,000-ohm bell which can be supplied with a couple of contact points. The head telephone makes an ideal testing appliance, as it is simple and convenient to handle and in use it leaves both of the hands free for other work. If one terminal from the receiver be grounded and the

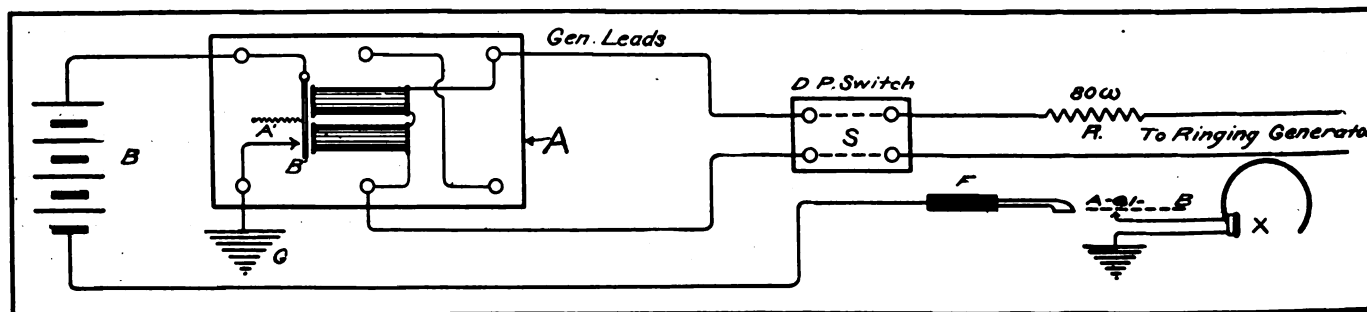


Figure 1.

side of the battery is connected to the feeler *F*, which is so made as to be easily attached to any wire on the main distributing frame at the central office. An old suspender clip may be soldered to a piece of flexible cord and used for this purpose. *S* represents a double pole switch which controls the relay. A single pole switch would answer as well for starting and stopping, but it would leave one side of the generator leads connected to the relay continuously, and if the relay should get out of order there would be a possibility that the generator leads might be grounded through the contact point at *B'*. The use of a double pole switch obviates this. *R* is an 80-ohm resistance placed in series with the generator leads and the relay, so that it is im-

other touched to the feeler, *F*, a series of clicks will be heard in the receiver, caused by the relay armature when making and breaking the contact at *B*. The frequency of these interruptions is an average of twenty per second.

So much for theory. Now, suppose that at a splice in a 120 pair cable, one wishes to find the wire *61* represented by *AB* in Fig. 1. The cable splice is opened in the usual manner and the wires loosened so that each is easily accessible. The cableman then grounds one side of his telephone to the cable sheath or other convenient ground and attaches the other to his cable shears. At the central office the inspector starts the relay and brings the feeler *F* in contact with the conductor *61*, which is represented

by *AB* in Fig. 1, first removing the heat coil if the line be a working one. When all is ready the cableman at the splice goes through the wires, cutting through the insulation with his shears, until they come in contact with the conductor. When

hooks it temporarily to a strip of wood, like that which is roughly shown in Fig. 4. This is merely a strip of wood with a series of small holes bored in it, $\frac{1}{2}$ inch apart, the number of holes of course, depending on the number of conductors one is

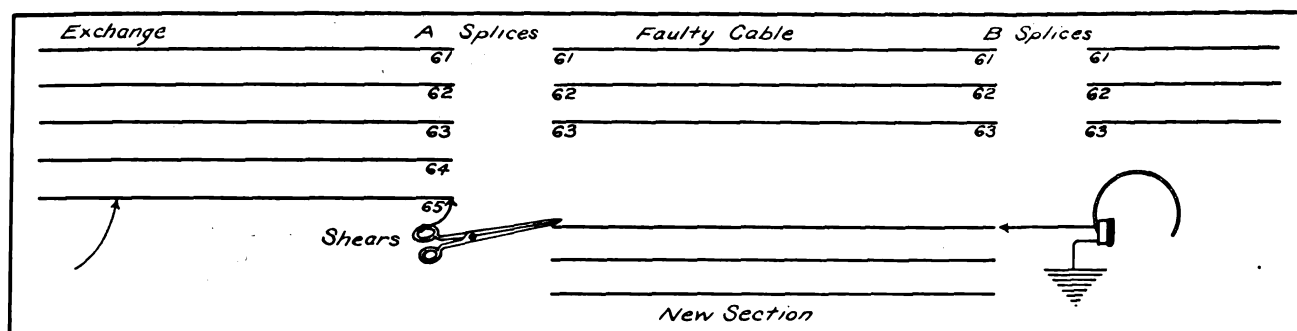


Figure 2.

he cuts into the conductor 61 he will get a hum in his ear, and then can make any further tests necessary.

If the new 15 pair box on this same cable was to be connected with conductors 61 to 90, the office inspector would connect

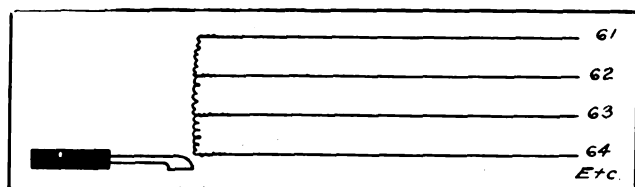


Figure 3.

together by means of an old wire the conductors 61 to 90, and put the relay on all of them at once by attaching the feeler as shown in Fig. 3. Then at the splice the cableman can distinguish these conductors the same as before. He can connect each wire as he finds it to a wire in the 15 pair cable going to the box. When he is finished, wires 61 to 90 are all picked out and connected to the 15 pair cable, and it only remains to go to

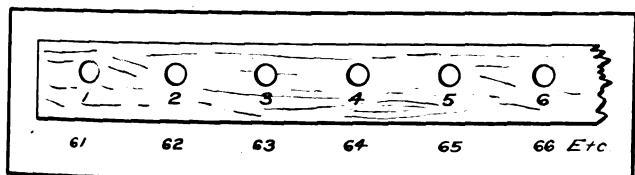


Figure 4

the terminal box and identify each of the conductors. Each can then be connected to its proper burr and operations can be continued after the manner of finding the wire 61, shown in Fig. 1. To do this the office inspector starts at 61 and goes through all of the wires to 90, touching each with the feeler and stopping at each wire until the man at the terminal box finds it and

working with. Opposite each hole this number is plainly marked so that the right hole can be quickly located. After each wire is then identified the cableman can, at his leisure, change the wires from the temporary strip to the burr in the terminal box without interfering with the service. In making tests of this kind it is usual for the men to use two receivers, one to talk over, and the other to test with. A pair of wires are selected by both men, and the speaking telephones connected to them, and in this way directions and advice can be easily communicated.

Now, supposing the cable to be faulty and the trouble located in a certain section which it is decided to replace, the cablemen

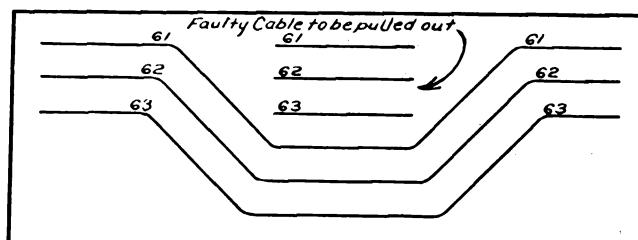


Figure 5.

first identify each wire in the old cable, then place them on temporary strips (Fig. 4). The office inspector puts his relay on any wire he may choose, say 65, and the cableman at the splice *A*, Fig. 2, picks out the wire 65 and connects it to his shears. Then he picks out any wire in the new section of cable and brings his shears in contact with it. At the splice *B*, (Fig. 2) the other cableman picks out the wire at his splice by means of his head telephone and a ground. The cableman at *A* then informs the man at *B*, or vice versa, to put this wire on 61. By repeating the operation the whole section is quickly tested out. Fig. 5 shows the new section of cable connected in around the faulty one, which will be withdrawn.

THE THREATENED MIDDLE WEST TELEPHONE WAR

THE threatened telephone war or active campaign by the Bell Telephone Company against the Independents in the Middle West, as foreshadowed by press dispatch from Boston, is giving the Independent people little or no concern. It is said the battle will wage the hottest in the Central Union's territory, the purpose being to keep the Independents out of Chicago. Such a warfare would be laughable if it was not a serious matter to the misguided people who are furnishing the money. It may seem strange, but nevertheless a fact, that Independent telephone people deplore the great loss of money that has grown out of the Bell Company's mismanagement, especially by the Michigan Bell and the Central Union. This deploiment is due to the fact that the Independent companies have, to some extent, suffered embar-

rassment in marketing their securities because of the loss growing out of the senseless management of these properties.

Before the threatened war is thoroughly inaugurated, it would be well for the Bell Company to settle with its bondholders, who are trying to recover a portion of their money through foreclosure proceedings in the Federal Court because of a shameful, selfish and illegal effort to oust the Independent companies in the Middle West. It would be well also to remember that during the war carried on in Michigan, which brought about such a trail of disintegration, the Independent movement grew to two and one-half times its strength previous to the fight forced upon it by the Bell Company. It is also a matter of history that soon after the Central Union inaugurated a war against the Independents

under the mistaken idea that it could cover the telephone world, it stopped paying dividends and has not paid any for at least six years. The Central Union plant was bonded for the immense sum of six million dollars, to which the parent company added two and a half million, all of which has been sunk in its senseless war.

In the meantime what has happened? The Independent telephone interests have grown, prospered and spread throughout the whole Central Union territory, with the exception of a few cities, but even the doors to these are ajar and will soon open to the more progressive Independents. It is confidently predicted that within the next few years the Independent companies will cover the whole of Ohio, Indiana, Michigan and Illinois, adding many hundred thousand telephones, and this, too, without taking into count whether the Boston people furnish one or a million dollars to carry on the threatened war.

The year 1895 found in this country one of the greatest necessities in business dominated by one of the greatest and most gigantic monopolies that ever existed under any form of government. It prosecuted its designs with an utter disregard of the rights or interests of the public, and from its full treasury gathered by its unreasonable and exorbitant charges, and in many cases unlawfully and in defiance of the statutes. It also controlled legislatures and large municipalities by means which no records will ever disclose. A glance over the field of operation throughout the Middle West will be sufficient to convince any stockholder of the Bell Company, or its allies, of the fruitless attempt to inaugurate a war to restrict the territory of the Independents. The morale of the once powerful monopoly is broken, its power and prestige are gone, its patents are dead, its war a failure. The American people know how to correct tyrannical abuses. This they will continue to do.

ARRANGEMENT OF TELEPHONE EXCHANGE POWER APPARATUS

By B. C. GROH.

THE power apparatus of a telephone exchange is important, and should have constant attention. In many exchanges, the arrangement of the machines, power switchboard and storage batteries is inconvenient, and therefore, a discussion of power plant plans will, it is hoped, prove of interest.

Take the storage battery; this should be in a room by itself, which should be well ventilated. If no window is available, a lead lined ventilator should lead to the outside air. The gas generated, when charging, is explosive, and should the battery room be ill ventilated, an explosion may take place. All woodwork in the battery room should be painted with several coats of black asphaltum to protect it from the acid fumes. It is desirable to have a cement floor, so that in case of accident no harm will be done.

The rack that supports the battery may be of wood or I beams; the latter are preferable, as shown in Fig. 2. Two I beams

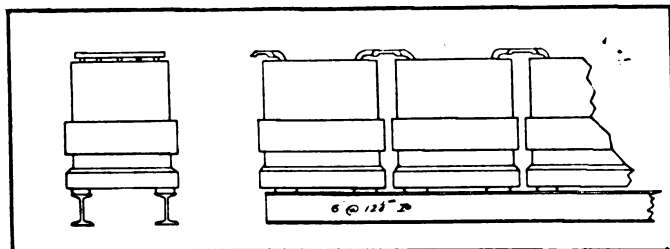


Figure 2. Method of Mounting Storage Batteries.

are placed under each row of cells. The I beams should be painted with several coats of black asphaltum before being placed in position under the cells. The insulators should be the regular type supplied by storage battery manufacturers. This arrangement makes a very satisfactory and substantial support, especially where cement floors are used, as the weight of the cells holds the I beams securely in position. It is well to place a short piece of flat iron under the ends of the I beams to compensate for any irregularities in the floor.

In some cases, each cell is mounted on an individual rack, so that in case of accident, it may be removed and repaired without disturbing the remainder of the battery. However, in a well inspected plant, a cause of trouble which would require the removal of a cell is not liable to occur, and it is a question whether the additional cost of this arrangement is warranted, especially when alloy tanks are used.

The next detail is the power switchboard. On this is mounted all switches, circuit-breakers, fuses and measuring instruments

used to charge and discharge the storage batteries. The power switchboard should be so located that an uninterrupted view of all machines can be had. Fig. 1 shows a layout for a rather large exchange. There are two motor generators for charging the batteries, one ringing machine which receives its motive power from an outside source, and another to be operated from the storage battery. All the machines are mounted on one pier, and the arrangement is such that any armature can be removed without interfering with the operation of the rest of the machines. The power switchboard is so situated that all the machines are directly under the eye of the attendant when at the board.

The machine pier should be built from an exceedingly substantial foundation. The top of the pier should be a slab of slate or marble and perfectly level. The pier above the floor line can have an outer course of pressed or enameled brick or similar

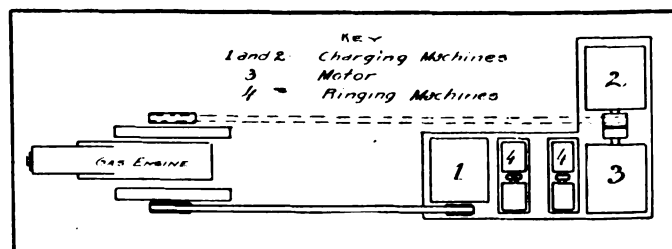


Figure 3. Arrangement of Gas Engine and Generators.

material. Some piers are hollow with a slate top, while another method is to construct the pier of angle and T-iron covering the sides and top with slate or marble.

The wires from the battery room and machines to the power switchboard should run in armoured conduit laid under the floor, with the circuits from each machine in separate ducts. The conduits should be installed while the pier is being constructed, and should terminate in their proper places. It is customary for the telephone company to build and install the piers and conduits from drawings furnished by the switchboard manufacturer. Great care should be taken in properly locating the conduit outlets, as errors in the location of the outlets are liable to make an untidy job of wiring.

In small exchanges where the source of outside power is reliable, one charging machine only may be installed, with an extra armature and set of fields for both the motor and generator. This extra apparatus should be kept on a suitable rack, so that in case of accident it would be easy of access.

Two ringing machines are necessary, in all exchanges, as this apparatus must be kept in continual operation, while the charging machines are only used as needed. The gas or gasoline engine is rapidly coming into favor as a source of power in telephone plants. The engine may be installed in the same room with the rest of

The gas engine pier should be built in a substantial manner of brick and concrete, with outside and top to correspond with the machine piers. Gas engine manufacturers send with each engine, anchor bolts and drawings showing the proper method of constructing the foundation pier.

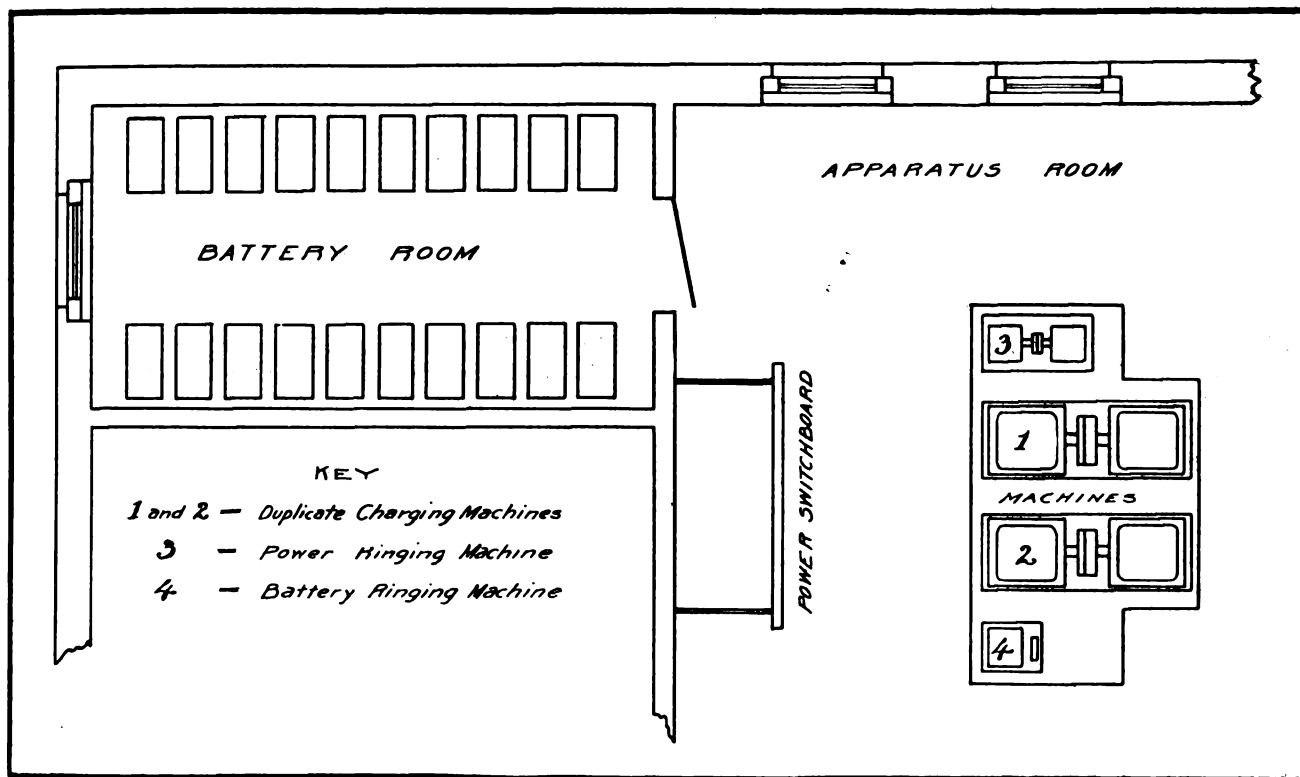


Figure 1. Floor plan of Power Room of a Telephone Exchange.

the equipment, and the generators so placed that either can be belted to the gas engine as shown in Fig. 3; thus the motor-generator can be run by the engine as well as the regular generator. Where a gas engine is used, an arrangement of switches can be installed so that the generators can be run as motors, to facilitate the starting of the engine.

It is well to have a closet in the power room for the reception of all tools and appliances necessary for the proper and efficient operation of the plant. The wire chief's or attendant's desk should be so located that a general view of the machines, and an unobstructed view of the power switchboard can be had at all times.

THE EFFICIENCY OF TELEPHONE CABLES WITH CONTINUOUSLY DISTRIBUTED SELF-INDUCTION

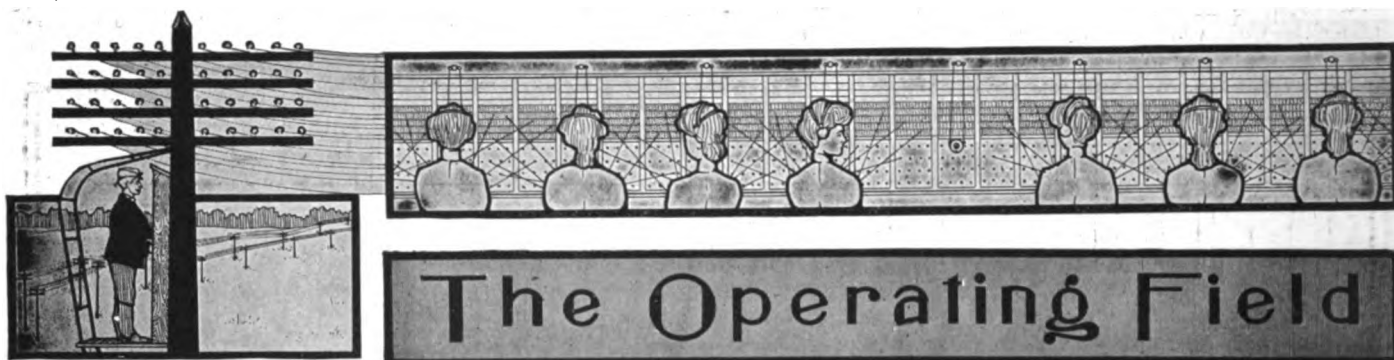
By Our Berlin Correspondent.

FOR some time past there have been endeavors in order to diminish the pernicious effect of electrostatic capacity in telephone lines, especially in the case of cables, by increasing the self-induction of the circuit. Now an artificial introduction of self-induction into cables may be effected in two essentially different ways, according as the copper conductors are either covered with magnetic material or the conductor broken at given intervals, wire coils of high self-induction being inserted. The research by F. Dolezalek and A. Ebeling, recorded in a recent number of the *Elektrotechnische Zeitschrift*, was made on behalf of Messrs. Siemens & Halske, with a view to ascertaining to what extent in the first way by means of self-inductions uniformly distributed the damping of the current waves may be diminished. This problem is of particular interest, as telephonic sea cables have been constructed according to this principle, a similar cable with iron cover having recently been laid between Denmark and Germany.

After giving a theoretical calculation of the electric constants of such cables, as well as of their influence on the damping of the current waves, measurements on especially constructed tele-

phone cables some hundred meters in length are recorded, serving to confirm the theoretical deductions. Finally, a comparison between the efficiency of cables with a continuously distributed self-induction and those with inductive coils inserted at given intervals is made.

The main advantage of the Pupin system, using inserted inductive coils, consists in the capacity of the cable not being increased, as in the case of iron sleeves. The high superiority of coil cables is proven on a numerical comparison between both types, it being shown that the damping constant of the coil cable is nearly three times smaller than the most favorable value of the sleeve cable, though this constitutes by no means an upper limit to the self-induction of the coil cable. The length of cable for which a convenient transmission is possible is next shown to be inversely proportional to the damping constant, the coil cable being thus able to overcome three times greater distances than iron sleeve cables. It is finally pointed out that the coil cable is superior to its competitor not only as regards efficiency, but as well in respect of the consumption of material.



POST OFFICE DISCRIMINATION AGAINST INDEPENDENT TELEPHONES MAKES TROUBLE.

THE order of Postmaster General Payne, which bars from the Post Office of the United States all Independent telephones, has raised a row. The order prescribes that only the instruments of the companies that have long distance connections with Washington shall be used. This means that the Bell company shall have a monopoly of the business.

In the Middle and Western States, where the Independent companies have a very extensive service, they are having charges of discrimination taken up by Congressmen. Cleveland, as the headquarters of many of the largest of the companies, has started the fight against the order, and it is aided by the National Independent Telephone Association and the State Telephone Association. A personal appeal has been made to President Roosevelt, who has promised to make an investigation.

Senator Hanna has been appealed to by capitalists interested in the Independent companies, many of whom are his warmest friends. Congressmen, too have been interested. President Dickson, of the Cuyahoga Company, of Cleveland, Ohio, has declined to remove his telephones, saying that he will make a fight and trust to the courts for his money.

THE TELEPHONE PROBLEM IN EVANSVILLE, IND.

THE Cumberland Telephone Company is beaten and is existing in Evansville by sufferance without franchise. The

United States court has declared there is nothing valid in its claims and that there is no reason why the city should not remove its poles and wires. The decision is that the Cumberland must get out of the way, but instead, it has filed an appeal bond, hopeful that the higher courts will take an opposite view of the important question from that declared by Judge Anderson. It is claimed that the result of the higher courts will be the same. On the other hand, the question is regarded as new and vitally important. The decision is that a corporation has no right to transfer its franchise to another corporation in the absence of provision specifically authorizing such transfer. In this connection it is contended that the franchise in question contained no provision that prohibited its transfer. A great number of public utility corporations have sold their property and rights to others, and there is much concern as to whether the law affords protection to a corporation against those who would ruthlessly destroy property and rights which have been transferred without specific authority.

The city of Evansville has the telephone franchise in its own hands. It is an asset of considerable value. The question is, can the city realize its full value better by operating as a partner in a private corporation, or by letting it to the best bidder among private corporations. Many citizens confess their lack of willingness to entrust the telephone service in Evansville to a municipal or semi-private company. They are urging as the safest plan, to realize the value of the telephone franchise and secure good service for the city, to frame an exclusive franchise for 25 years,

and let it to the private corporation making the best offer. This would, it is claimed, open the door to the Independent companies which are sufficiently able to bid the true worth of the franchise and assure good service.

UNITED STATES COMPANY TO BUILD.

MANAGER C. L. BRAUCHER announces that the United States Telephone Company will soon begin the expenditure of half a million dollars on the lines leading out of Toledo. The United States is an Independent toll line company. A large force of men will begin stringing new wires between Toledo and Cleveland, via Thompson's Corners, the latter being a switch station. It is further announced that during the coming summer the line will be extended to Buffalo. The line will also be extended west to South Bend, where a through connection with Chicago will be made. This city will also be connected with Saginaw on the north and with Fremont and Dayton on the south. The company already has a line to Cleveland, but on account of the rapidly increasing business, the present wires will be used for local service, while the new wires will be set aside for through business. The United States Company operates 18,000 miles of wire, and when the new extensions are completed the Toledo division alone will have 8,000 miles of wire. The company is capitalized at \$2,000,000.

PROGRESS OF UTAH INDEPENDENT COMPANY.

THE Utah Independent Telephone company is pushing its work to completion with all possible speed. E. L. Sloan, secretary of the company, was lately in Ogden for the purpose of securing a portion of the right of way between Ogden and Salt Lake, which had not been secured. The poles have been set as far as Farmington and the right of way between that point and Ogden will shortly be arranged for.

KANSAS CITY EXCHANGE OPENED.

THE operation of about eight hundred telephones in the East district exchange of the Kansas City Home Telephone Company, was started recently. The exchange has a capacity of twelve hundred instruments and all these will be in service as soon as they can be connected. For the present patrons will be unable to telephone outside the district and until the other exchanges in the city are put in operation there will be no charge for service. The company's contract with its subscribers provides that regular pay service shall not be begun until four thousand telephones have been connected. A test of the East exchange has been made and it was found to be entirely satisfactory.

Officers of the company believe the entire system in the two Kansas Citys will be in operation by January 24. It is planned to start the main exchange on that date and it is thought all the others will be ready for operation by that time. The company has contracts with between 8,000 and 9,000 subscribers. Sixty men are now at work installing the boards in the main exchange on Baltimore avenue, and making the necessary connections. By

the last of this month it is hoped to have the entire system in perfect working order. It was expected to begin operations by October 1, but delays were caused by the flood and other unavoidable happenings. The greatest difficulty was in securing the materials with which to finish the exchange buildings. The operation of such of the telephones in the east district as are connected at this time is to give the apparatus a thorough test and to finish the operators' practice.

AN EDUCATION FOR SEVENTY CENTS.

THE American School of Correspondence has adopted a method of advertising which, even if it is not profitable to them, is a very good thing for students of electricity. As readers of the technical periodicals have doubtless noted, that institution has arranged under one cover four of the forty-five text books which it uses in teaching its course in Electrical Engineering, and is selling the whole for seventy cents. The four chosen are: "Elements of Electricity," and "The Electric Current," both by L. K. Sager, S. B., LL. B.; "Electric Wiring," by H. C. Cushing, Jr.; and "Storage Batteries," by F. B. Crocker, E. M., Ph. D., Professor of Electrical Engineering at Columbia University. They are all crisply and concisely written and well condensed. There are incorporated in the volume several tables and a whole lot of reference data, which would be of considerable value to one engaged in any electrical line. The book is described somewhere in the advertising section of this issue.

The section on Storage Batteries, by Prof. Crocker, strikes us as being particularly good. It gives just the sort of storage battery information and tells it in just the sort of way that will reach the practical telephone man, who should at least have a good idea of this appliance which is now so common in these days of central energy. There are 256 pages in the volume.

PENINSULAR COMPANY RELIEVED FROM SHARING EARNINGS WITH CITY.

THE Peninsular Telephone Company, of Tampa, Florida, was recently granted relief from paying 5 per cent. of its gross earnings into the city treasury. In granting the company relief from its 5 per cent. contribution, the Council stipulated that it should maintain an extra underground conduit for the exclusive use of the city.

In commenting on the matter a local paper says: It is proper to mention that the relief granted the Peninsular Company was largely due to the popularity of the management, President Brorein having always shown a commendable disposition to accommodate the public in every way, and his liberal policy has been highly appreciated by the Council and the citizens. It is doubtful if any other corporation in the city could have obtained such a concession from the Council.

MEET IN ILLINOIS TO ORGANIZE ASSOCIATION.

REPRESENTATIVES of thirteen Independent telephone companies of central and western Illinois met in Jacksonville, Ill., recently for the purpose of organizing an Independent telephone association and arranging matters so that it will be clearly understood what part of the gross charge each company is to receive for the transmission of a long-distance message, or of messages other than local. It is expected during the present year they will establish copper metallic circuits between Hannibal, Springfield, Alton, Louisiana, Jacksonville, and other cities of importance in the district embraced by the following counties, which were represented in the meeting: Calhoun, Jersey, Macoupin, Green, Scott, Morgan, Cass, Sangamon, Pike, Adams, Brown, Hancock, Hannibal and several counties in Missouri.

The following gentlemen were present at the meeting:

C. F. Tonn, general manager of the Illinois Telephone Company; J. L. Jennings, of Fayette; W. H. Ramsey, of Auburn; John G. Pratt, of Virginia; E. D. Boynton, of Pleasant Plains; W. G. Tucker, of Virden; W. J. Finch, Jr., of Chesterfield; A. T. Vanniman, of Girard; A. F. Loehr, of Carlinville; Ed. D. Glandon, of Pittsfield; H. G. Conger, of Hannibal; F. W. Kelley, of Springfield, and W. B. Rogers, of Waverly.

ANNUAL MEETING OF ROME, N. Y., COMPANY.

THE annual meeting of the Rome, N. Y., Home Telephone Company was held recently. Fred. M. Shelley was re-elected president and John S. Wardwell, vice-president. D. Odell was retained as manager and was also elected secretary and treasurer of the company. The directors are James S. Brailey, Jr., of Toledo, Ohio; Irving H. Griswold, of Albany; Fred. M. Shelley, John S. Wardwell, John E. Mason, William H. Grogan and T. M. Brush, of Rome. The report made by Manager Odell was a very encouraging one and went to show that the increase in the number of telephones went far beyond the expectations of those interested. The company now has 1,004 instruments and contracts are being signed daily. When the company started provision was made for 500 telephones, but the service has been so good that the people preferred the Independent to the Bell service, and the capacity of the switchboard was steadily increased. The telephone book has so many names that it is virtually a city directory. A new directory will soon be issued.

NEBRASKA ASSOCIATION MEETING.

SECRETARY E. C. HANSEN announces the regular annual meeting of the Independent Telephone Association of Nebraska will be held in Lincoln, Neb., on January 18 and 19, 1904, at the Lindell Hotel. It is suggested that all that intend to be present make a memorandum of such questions as they wish to ask, so that there will be no unnecessary delay or time lost during the convention sessions. This will be an excellent opportunity to see the new Lincoln Exchange now in course of construction.

THE BUFFALO-ROCHESTER DISTRICT DIRECTORY.

THE telephone exchange manager is annually confronted with one of his difficult problems in the preparation of a directory which shall satisfy the desires and demands of all of his subscribers. In the past many examples of directory book making have been issued, but few of which have escaped the fire of a just, if a merciless, criticism. The Independent directory of the Rochester-Buffalo district is a good example of a modern effort at the solution of this problem, and one which contains many features which will well repay the study of the telephone exchange manager. This directory comprises a list of the subscribers of the Independent systems within the territory comprised in this caption, and these subscribers are now able to reach each other through the Long Distance lines connecting the various towns in Northwestern New York. The directory opens with a series of concise suggestions apropos to the general use of the telephone and the business to be transacted between the subscriber and the central office. It is impossible to adequately abstract this section because the typographical arrangement has much to do with the perspicuous presentation of the subject. Next follows a list of telephone pay stations, and a point is scored in arranging the numbers and location in one type, the subscriber's name and address in a second, while the telephone number is in a third. Next succeeds an alphabetical list of subscribers arranged in somewhat similar manner, with the addition that the various business houses having private branch exchanges are set in heavy face and instructions are given to aid the subscriber in finding the proper department which he desires. This directory is really made up of a collection of directories, Rochester, Buffalo, and a number of other towns which are united by the Independent Long Distance system in question, and in addition to the general alphabetic arrangement the balance is so contrived as to enable one to easily find the location of any subscriber, no matter in what city he is to be found. The book is almost an inch thick and shows in a forcible manner what the Independents have accomplished in New York State. The addition is limited, but a few copies can be sold to those desiring them. Fifty cents in stamps sent to the Inter-Ocean Telephone & Telegraph Company, 536 Ellicott Square, Buffalo, N. Y., is all that is necessary.



THE RESULT OF A SHABBY TRICK.

THE announcement that we made two weeks ago of the organization of the Dean Electric Company ought to bring a great deal of satisfaction to every man genuinely interested in the Independent telephone business. The new company is to have for its General Manager, A. E. Barker, and for its Vice-President and Chief Engineer, W. W. Dean.

Under ordinary circumstances no special signification would attach to the appearance of this new corporation. In this particular case, however, it means that another blow aimed by the American Bell Telephone Company at the Independent industry of the country has gone aslant. It means that the large investment made by the manufacturing branch of the Bell Company in the purchase of the Kellogg Switchboard and Supply Company is going the way of all other investments made by the Bell people with a view to crippling Independent development. For the going of Messrs. Dean and Barker brings the first positive sign of the disintegration of the Kellogg organization. It means the beginning of the end with that company. It means that the shabby trick played by Mr. Fish and Mr. Barton and their associates in the Bell management is going to bear just the sort of fruit that all clean-minded business men knew it must bear. There are, undoubtedly, instances in the history of American industry where industrial brigandage has proved profitable to the men who practiced it. The example of the Standard Oil Company proves this clearly enough. But it has always been our conviction that, whatever might be possible in the oil field, in the Independent telephone field such methods would come to grief. No other conclusion, it seems to us, in view of the character of the men in the Independent business, is possible, and when the experience of telephone men so far is reviewed, we have a striking example of the failure of all methods of this class. Striking examples are the collapse of the Erie, the hopeless condition of the Central Union, and the bankruptcy of the Michigan Bell companies. All of these concerns, with their huge capitalization, owed their ruin to the fact that they endeavored to meet Independent competition not in an open, honest, fair-handed spirit, but by treachery, secret rate-cutting, underhand press work, and open bribery.

One would have supposed that with these examples before them the American Bell Company would have hesitated to go further afield in this course. And the general impression had gained some ground that this sort of competition *had* practically ended, that the gentlemen in Boston had seen the light and realized that the Independents were not to be crushed out by bushwhacking. It was not until the facts relating to the disreputable Kellogg deal were dragged into the open through the manly fight of the minority stockholders, that we all were forced to the conclusion that the Bell Company was still blindly adhering to its old policy of craft and treachery.

THE CAUSE OF TELEPHONY'S NEW TACK.

It was the final realization of this fact, that induced THE AMERICAN TELEPHONE JOURNAL and those two other Independent publications, the *Telephone Magazine* and *Sound Waves*, to go systematically into the work of nullifying the vicious ends that had been sought through the consummation of the Kellogg sale. How thoroughly success has met these efforts is shown by the withdrawal of Messrs. Dean and Barker from the Kellogg Company and the gradual crumbling of its business. While it is true that there are a number of able men still left with that concern, it is also true that these men have no further heart for their work; they realize that they are serving unclean masters, and they are remaining with the company, not because they wish to, but because their business situation is such that for the time being they are bound.

In this connection it is interesting to note the new tactics that the Bell crowd is pursuing in the attempt to nullify, or, at least, minimize, the injury that THE AMERICAN TELEPHONE JOURNAL is inflicting on them through its continued exposure of the nefarious Kellogg business.

In our issue of last week we described the effort that was made to offset our work by the printing of an elaborate eulogy of Mr. Barton and his Bell associates in the columns of a so-called "Independent" telephone paper, *Telephony*. When the fact, obvious enough to everybody else, was made clear to the Bell gentlemen that the very printing of such a eulogy branded this publication openly as a tool of the monopoly and therefore rendered its work along these lines futile, a switch was hastily made to the new system. In pursuance of this policy, *Telephony*, in its January issue, teems with abuse of THE AMERICAN TELEPHONE JOURNAL. Of course, the exercise of ordinary intelligence by the Bell people would make clear to them the fact that the animus of the new course is as obvious as was the old, and that every telephone man in the country will realize that on its new tack *Telephony* is simply working out the same sort of service that it rendered when it devoted itself to the praise of Mr. Barton and the Bell Company in connection with the Kellogg deal. But ordinary intelligence, as has been shown so often in these columns, is not a gift of the American Bell Telephone Company, nor of its employees. They are so blinded by belief in their own power that they are unable to see that the supposed craft, which they exercise, is the most stupid blundering.

We believe we made this clear when we exposed the combination work of Mr. Fred. DeLand and *Telephony*, as far back as last March. It will be remembered that at this time Mr. DeLand was running a series of signed articles in *Telephony*, the gist of which was a systematic misrepresentation of the relative strength of the Bell and Independent companies through a juggling of figures. As a result of our exposure at that time, the open attack

was abandoned by Mr. DeLand in *Telephony*. That is, the signed articles stopped at once. In their place, however, there have appeared regularly, a number of anonymous articles, all bearing along the same lines, and all carefully spread through the Bell press bureau as emanations "from the Independent press," after they had been first fathered by *Telephony*. Naturally THE AMERICAN TELEPHONE JOURNAL made it its first business to follow up these false publications, and brand them for what they were, emanations from the pen of a Bell agent, presented in the columns of a paper that was falsely masquerading as an Independent organ. It is in the hope of hampering our work in this direction and, as already stated, of minimizing the force of our exposure of the Kellogg matter, that this new Bell policy has been mapped out in the shape of a series of abusive articles in *Telephony*, which, like the others, are from the pen of Mr. Fred. DeLand.

A few examples from the January number of the paper will show the sort of work that Mr. DeLand is doing in *Telephony*. For example, Mr. DeLand "ingenuously" points out in the January number that in our issue of December 5 we had a "laudatory (leading) article on the Bell system in the treasury department." We quote from *Telephony*:

"Immediately following this, on page 356, he would have found a very interesting technical article written by three engineers who are now in the employ of the Bell Company. Immediately following this, on page 359, he would have found an article by an erstwhile Bell engineer. Immediately following this, on page 361, he would have found an article written by another engineer in the Bell employ. Immediately following this, on page 363, he would have found a description of a Bell training school, etc. Before going any further or reading the article by Herbert Laws Webb (assistant to the New York Bell manager) on page 369, or a description of the Bell system on page 371, he would quite likely have thrown the book aside, etc."

It would be difficult to find a finer example, or rather a coarser one, of the Bell methods. The usual brazen misrepresentations that must inevitably bring their own exposure, yet indulged fatuously in the hope that, after all, the false statements might be swallowed.

It is, doubtless, unnecessary to go into the matter at all, as Independent telephone men have shown full capacity to do their own thinking, but, nevertheless, as an example of the stupid work ordinarily done, it is interesting to analyze these allegations. The "laudatory (leading) article on the Bell system in the treasury department" referred to was a description of the interior system in the treasury, written by Mr. Harold Bolce, our Washington representative. It made clear in the most graphic fashion the enormous difference that has been made in the work of the government by the installation of comprehensive systems, and, to our certain knowledge, has been liberally used by Independent operators and manufacturers as campaign material to secure the installation of private branch exchanges in large mercantile and manufacturing establishments.

"The interesting technical article written by three engineers who are now in the employ of the Bell Company" was an ingenuous reference to an article in the series on "Exchange Engineering," which has been running for over a year, and has probably attracted wider attention than any technical series ever undertaken. Its authors are Messrs. Manson, Libby, and Simpson, three of the most talented young men in the telephone field, men for whom everyone entertains the highest respect and consideration. It happens that these three gentlemen, like many other sincere Independents, entered the employ of the Kellogg Switchboard and Supply Company years ago, before there was the slightest suspicion against that concern. They remain because, like others, their business arrangements make it obligatory. Curiously enough, this very series was solicited most earnestly by the publishers of *Telephony*, but, owing to the bad reputation that paper has always enjoyed among technical men, the authors declined to enter into any business connections with its publishers.

Then there is the reference to an article on page 359 "by an erstwhile Bell engineer." This "erstwhile Bell engineer" is Mr. Arthur Vaughn Abbott, who retired from the Bell field years ago to become the chief engineer of the Independent Century Telephone Construction Co. Mr. Abbott is now one of the chief engineers of the Westinghouse, Church, Kerr Company.

"On page 361," Mr. DeLand tells us in *Telephony*, there was an article "written by another engineer in the Bell employ." This had reference to Mr. W. W. Dean's paper on Telephone Receiver Design. How much of an "engineer in the Bell employ" Mr. Dean is, is shown by the fact noted above of his leaving the Kellogg Company at the first opportunity and organizing a new Independent manufacturing concern.

The covert allusion to an article on "a Bell training school on page 363," refers to the very interesting contribution written by Mrs. Brown, chief operator for Messrs. Barber and Brailey (The Central Construction Company) in which she described her methods in training operators for the Independent exchanges installed by these gentlemen in Louisville, Utica, Toledo, etc.

Finally, we have reference to the article by Mr. Herbert Laws Webb, "assistant to the New York Bell manager," as *Telephony* puts it. As a matter of fact, Mr. Webb, who has been one of the most valued contributors to our columns, has not been connected with the Bell company for two years. During the past year he has been abroad in connection with the promotion of a new system of telegraphy and at the present time is a resident of London, England, where he is in business as a consulting engineer.

This slight analysis makes clear the crude misrepresentation on which the Bell people rely to overcome the fight we are making and shall continue to make on the Kellogg iniquity and the general Bell methods.

We have offered this analysis not because we believe it is needed, but simply to point out the system pursued by the peculiar minds that serve the gentlemen at the Bell headquarters.

We shall continue to devote our columns in the future, as in the past, to the work we have undertaken, and shall exclude rigidly such matter as the paper *Telephony* puts out through the pens of men like Mr. Fred. DeLand and Mr. Oscar Wentworth Rogers. Technically our columns will always be open to advanced telephone matter whether it emanates from Independent or Bell engineers. Unfortunately there is small prospect that we shall be able to secure many contributions from Bell technicians, owing to the fact that it is as much as a man's position is worth with the Bell company to publish anything regarding the art that he may know. We regret to say that on two occasions Bell employees have lost their places because they appeared in our columns as authors of technical papers. In both of these instances, however, the men no doubt benefited themselves in the end, for we soon found them positions with Independent companies where their pay was even better than it had been with the monopoly, and where they could enjoy the boon of writing or talking as they pleased.

When this boon is generally accorded by the Bell company to its employees as it is by the Independent companies to their employees, and when the managers of that corporation give up their disreputable mode of warfare against the Independents, we shall consider the question of treating them as though they were honest men. In the meantime, we consider them worse, far worse, than the common wire thieves whom all telephone men despise, and we shall continue to fight them and their tools, among the most vicious of which we consider the paper *Telephony*, its chief contributor, Mr. Fred DeLand, and the Kellogg Switchboard & Supply Co., in the order named.

TELEPHONES ON TROLLEY CARS.

THE Terre Haute, Indiana, Electric Railway Company is constructing a new system of communication along its new Clinton line. Instead of having telephones at the switches, as it has on its Brazil line, each interurban car is to have a telephone, and when communication is desired, it can be secured almost any place along the line. This will be made possible by stringing the telephone wires along the trolley poles and having plug holes in certain poles similar to the plugs used on a switchboard at a telephone exchange. Each car telephone will have a long wire, on the end of which is the plug to be inserted in the pole. All that will be necessary, then is for the car to stop in front of plug-pole, "plug in" and call up the train dispatcher by ringing the bell.



Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

CAN BE COMPELLED TO MOVE WIRE WHICH RUNS OVER LOT.

WE have telephone wires strung across a vacant lot. The lowest wire is 30 feet from the ground and is 20 feet from any building. The wires have been in use for six years. There are no poles set on the lot. The owner has ordered us to remove the wires. There is no reason for removing them, no building to interfere or anything of the kind. Can he compel us to do so?

2. We have a lead of wires running along the public highway close to a dwelling. The noise from the wires disturbs the occupants of the house. Can they compel us to move the lead? M. M. H.

THE owner of the lot across which your wires run can compel you to remove them. "Land hath also, in its legal signification, an indefinite extent, upwards as well as downwards. *Cujus est solum, ejus est usque ad coelum*, is the maxim of the law; upwards, therefore, no man may erect any building or the like to overhang another's land." 2 Blk., chap. 2. If a man owns above his lot even to the sky, it follows that he can compel the removal of any wires that cross his land, no matter how high up they are or how little harm they do.

2. In answering your second question, I will presume that you have a right to be in the highway; that you have complied with State laws on the subject and obtained the consent of the abutting property owners. If this is the case, I do not believe the occupants of the house can force you to move the lead of wires. If the enjoyment by one person of his rights incidentally annoys another person, the latter cannot complain so long as that which is done by the former is not in point of locality unsuitable and in point of management unreasonable. Cooley, Torts (2d Ed.), 710.

COUNCIL MAY DISCRIMINATE BETWEEN FRANCHISES.

HAS a city council or councils the right to grant the Bell Telephone Company an unlimited franchise and no restrictions as to rates to be charged for service, and limit a franchise for an Independent company and stipulate the rates of service? Is not such action a discrimination against the best interest of patrons in favor of a monopoly? J. A. H.

A FRANCHISE is a contract between the municipality and the company. As a general rule city councils may grant limited or unlimited franchises, as they see fit, and may make one sort of contract with one company and a different sort with another company. Such an act certainly would be a discrimination between the companies and might be unjust and contrary to the best interests of the patrons, but the council could do it if it saw fit and its discretion could not be questioned. The rule that exists in regards companies, prescribing discrimination between patrons, does not exist as regards municipalities and the granting of franchises. Such action as you describe might favor an attempted monopoly, but there can no longer be said to be a telephone monopoly since the great growth of Independent companies.

THE LATEST CASE ON ADDITIONAL SERVITUDE.

THE latest case on the question whether the erection of a telephone system in the streets of a city constitutes an additional servitude for which abutting property owners are entitled to compensation is Kirby vs. Citizens' Telephone Company, of Sioux Falls, decided by the Supreme Court of South Dakota. The Telephone Company was proceeding to erect a telephone pole on a grass plot, between the sidewalk in front of plaintiff's premises and the curb line. The owner of the lot secured a temporary injunction, which he asked to have made permanent, restraining the company from setting the pole. The

common council of the city had authorized the company to construct, maintain and operate its line along the streets. The plaintiff, who was defeated in the lower court, and was therefore appellant in Supreme Court, contended that under the constitution of the State the city authorities could not grant the right to the company to erect its system in the streets, and that, if it had authority to grant such right, the company could not erect the same without compensating the abutting property owner. Upon these points the court overruled appellant's contention, holding that the article of the constitution, providing that compensation shall be made before private property is taken or injured for a public use, does not apply to the use of the streets of a city for the purposes for which they have been dedicated. It held also that the city had the right to grant a franchise to the telephone company.

The opinion then continues: "Upon the main question that is presented for our determination the authorities are not in harmony, and any attempt to reconcile them would be useless. One line of authorities holds that the construction of telephone systems along the streets of cities imposes no additional servitude upon the abutting property owners, and that said owners are not entitled to compensation for any damages they may sustain by reason of the construction of such system. The other line of authorities take the view that such a system creates or imposes upon the abutting property owners an additional servitude for which they are entitled to compensation for such damages as they may sustain. After a careful examination of these authorities, we have arrived at the conclusion that the decisions of the courts taking the former view are not only sustained by the greater weight of authority, but by the better reasoning, and should be followed." The court cited cases from Massachusetts, Missouri, Minnesota, Michigan, Montana, New York, District of Columbia, Pennsylvania, and Indiana to sustain its contention. The Supreme Court of North Dakota holds the other way. Kirby vs. Citizens' Tel. Co., 97 N. W., 3.

PATENT SUIT TO EMBARRASS INDEPENDENT COMPANY.

THE defendant in the case of the Western Electric Company vs. the Toledo Home Telephone Company has filed an answer to the plaintiff's bill in the United States Circuit Court at Toledo, Ohio. The suit involves certain telephone devices for which the complainant claims to hold the patent. The defendant denies that the patent, which was secured by C. F. Scribner, a former Toledo man, is good and valid in law, and avers that it required no invention and that it contains no patentable novelty. Further the defendant asserts that the alleged letters patent are null and void because C. F. Scribner was not the first and true inventor. There is also a denial of any conspiracy to injure the plaintiff and the local company avers that it made no profit out of the alleged patent.

The defendant further denies that the complainant is the real owner of the patent and alleges that the American Bell Telephone Company, or its successor, the American Telephone and Telegraph Company, is the real owner, and that this corporation also directs and controls the acts of the complainant in which it is the largest shareholder. The suit is brought, so the defendant avers, simply for the purpose of intimidation and annoyance in the competition between the Central Union Telephone Company, a subsidiary corporation of the American Bell Telephone Company, and the defendant. The defendant prays that the case may be dismissed. U. S. Circuit Court, Toledo, Ohio.

Questions on any subject relating to the technical side of telephony will be answered in this column.

HUDGES' INDUCTION BALANCE.—(267.)

What is Huges' Induction Balance? How does it work, and for what is it used? G. A. M.

A circuit of an induction balance is illustrated in Fig. 267. It consists of a battery *B*, a microphone *M*, four coils *S*₁, *S*₂, *P*₁ and *P*₂, and a telephone receiver *T*. The coils *S*₁, *P*₁ and *S*₂ and

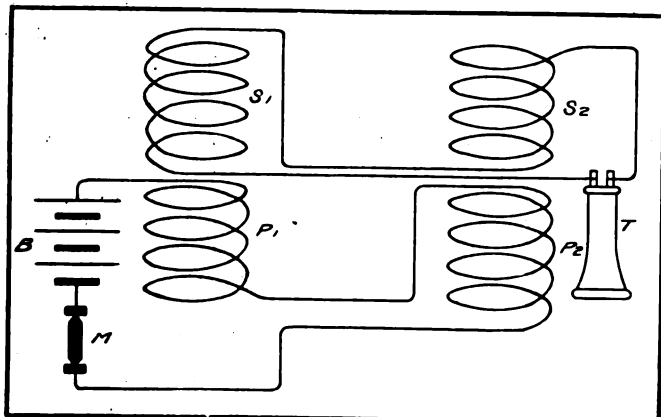


Figure 267.

*P*₂ are respectively the secondaries, the primaries of induction coils, which must be wound exactly alike in every respect, resistance, number of turns, kind of metal, etc. *S*₁ and *S*₂ are wound in opposite directions. Now, under such circumstances, if the coils are exactly balanced no sound will be heard in the receiver *T*. On the contrary, if any metallic object be brought in the vicinity of *S*₂ its balance with reference to the other coils is disturbed on account of the inductive effect which is produced between the coil *S*₂ and the metallic object which approached it. Under these circumstances a sound is heard in the receiver, and by moving the coil *S*₂ to and fro the location of the metallic object may be detected by changes in the sound emitted by the receiver. Such an apparatus has been used for the location of bullets or other objects in the human body, as a method of de-

A FRENCH TELEPHONE SET.—(268.)

Can you please give me more information about the telephone that is described on page 5 of your issue of Jan. 2, 1904, in the article by Mr. Lid-

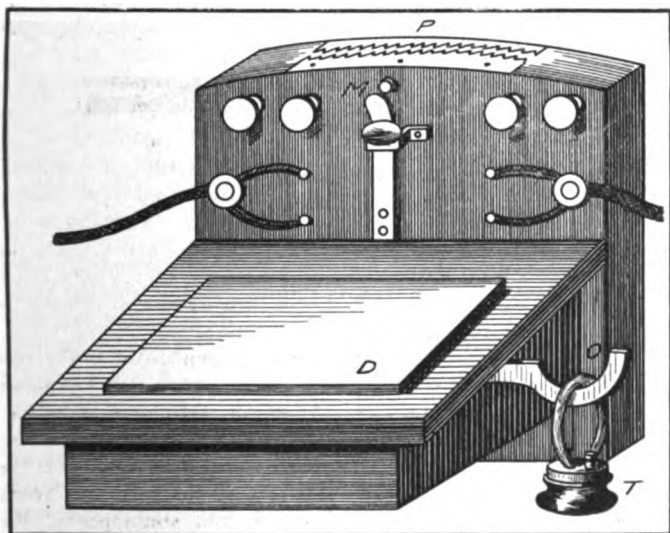


Figure 268a.

tecting discontinuity and short circuits in magneto coils and for other purposes of testing.

berg, which was entitled "An American Engineer's Observations in Europe?" I was very much interested in the description of the French telephone, but there was not enough of it to satisfy me. F. N. H.

There is not much information obtainable on the type of instrument that you wish described, but we are able to furnish you with two views of it and the following description: Fig. 268a shows the instrument as supported on the wall, and Fig. 268b shows it on its back, so that the working parts may be more plainly seen. On the under side of a horizontal, thin spruce board, *D* (Fig. 268a), has been placed the microphonic system which is composed of a sort of double grating with 24 carbon contacts, as shown in Fig. 268b. The double grating is composed of three cross pieces of carbon which support loosely in cavities 12 round sticks of carbon, *E*. These sticks form at their extremities small trunnions arranged to turn easily in the holes of the cross pieces. There are then 24 trunnions and consequently 24 contacts, so that the instrument is very sensitive to impinging sound waves. The induction coil is at *B* and the switch hook at *C*. The bell call button is at *M* (Fig. 268a) and at *P* is a saw-tooth lightning arrester. Two receivers are used with the instrument, one being located at either side.

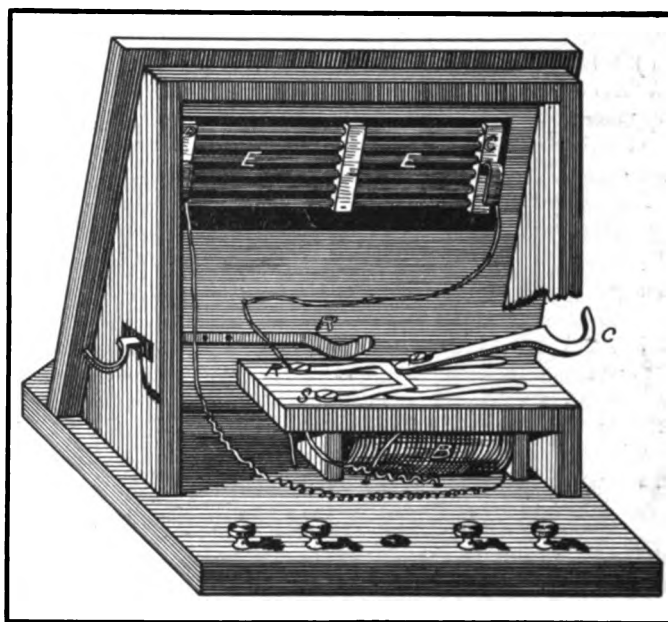


Figure 268b.

ROSIN SOLDER.—(269.)

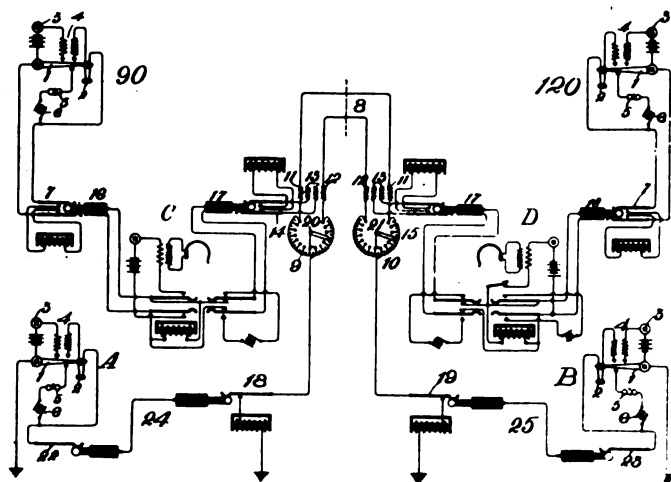
Will you please tell me how the solder called rosin solder is made and what is the solution that linemen ordinarily use for soldering? A. B.

What is called rosin solder is sometimes made from a hollow tube of solder metal about 3/32 of an inch in diameter, which is filled with resin. This forms an exceedingly desirable and convenient form of solder, especially for switchboard work. The common soldering fluid is made by dissolving zinc in muriatic acid until the acid is exhausted. This forms a soldering fluid. If desired, this fluid may be evaporated nearly to dryness, which results in a kind of a paste which may be applied in soldering. Sometimes a little sal-ammoniac is added to the fluid after the zinc is dissolved and before it is evaporated. The amount of sal-ammoniac added under these circumstances is usually about 1/4 of the weight of the fluid. The use of such a soldering fluid as this is not permissible in switchboard work, as in time it will corrode the connections and make trouble.

PATENTS ISSUED

IMPROVEMENT IN DUPLEX TELEPHONY.

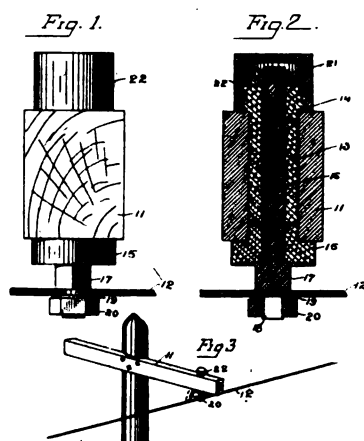
H. O. Rugh, of Chicago, Ill., patents (No. 747,491) and assigns to the Illinois Electric Specialty Company an improved circuit for composite or duplex telephony. In composite telephony much trouble is experienced in such accurate balancing of both sides of the line as is necessary to successful transmission. The ob-



ject of the inventor is to provide an easy method of always securing a balance. The circuit is shown in the figure. Two telephone stations are shown at 90 and 120. These are metallic lines and are extended to the switchboard, where they terminate in jacks 7 and 7. Two grounded telephone stations are shown at A and B, which also terminate in jacks 18 and 19. The metallic lines end in rheostats 20 and 21 and are furnished with repeating coils 11, 13 and 12. The grounded lines run to the center of the rheostats 20 and 21. Now, it is evident that by means of the rheostat arms each grounded line may be connected at each point of the coil which forms the rheostat, and by this means any desired balance can be almost instantly obtained.

IMPROVED LINE INSULATOR.

Beauregard Cullen, of New Albany, Ind., patents (No. 746,469) an improved line insulator. This is shown in Figs. 1, 2 and 3, in which Fig. 1 is a general elevation, Fig. 2 the section, and Fig. 3

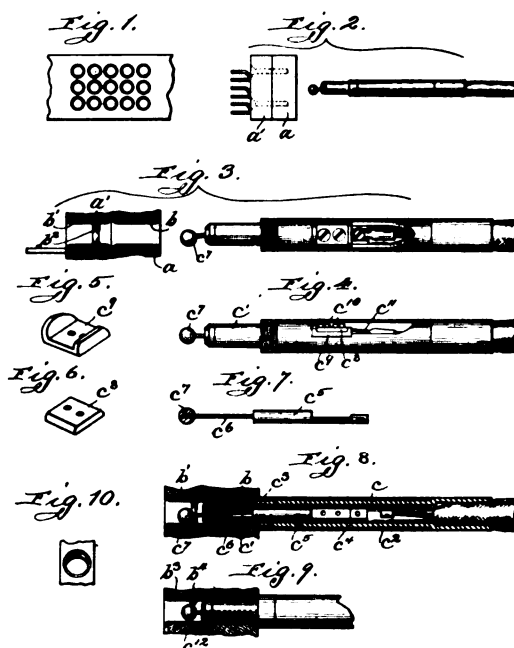


the insulator in place upon a pole. There is a cross arm 11 through which there is a vertical hole, and in this an insulating plug 13 is placed. This is threaded on the top and over it a cap

22 is secured. This plug has a hole in the center, and in the hole a bolt 17 is inserted and secured on the top by means of a nut and washer 21. Upon the lower end of this plug is another insulating cap 15 which fits the hole in the cross arm, as shown. The lower end of the bolt 17 carries a nut and washer 19 and 20 which is designed to support the line wire 12.

IMPROVED SWITCHBOARD PLUG.

William W. Dean, of Chicago, Ill., patents (No. 747,911) an improved switchboard plug. The object of this invention is to provide a plug which shall be more compact than those formerly in use, and which shall enable a smaller jack to be used and therefore a greater number of jacks to be placed in the reach of an operator, and so relieve the jack of much of the wear to which it is now exposed. This invention is shown in Figs. 1 to 9 inclusive. From Fig. 3 it will be perceived that the jack, instead of consisting of a ring and a spring, as was formerly the case, is made of two rings, A and B'. The ring B' has a ridge B2 in it. As shown in Fig. 4, the plug differs from the old-fashioned switchboard plug in being constructed in such a manner that the tip c7 consists of a ball or sphere of metal, which is mounted upon a flexible wire or springs and inserted in the plug. By this

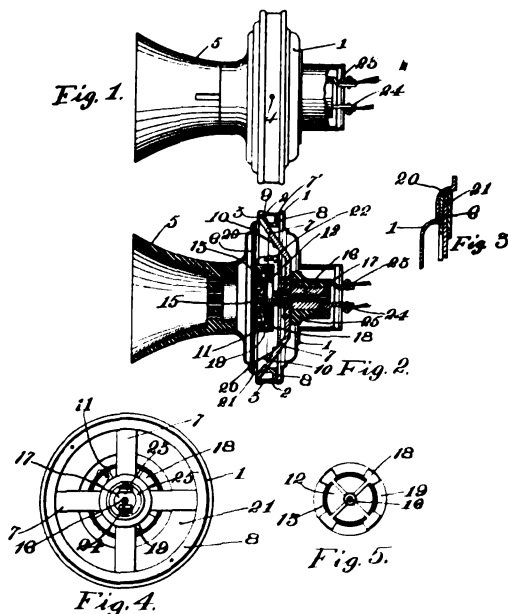


means (as is shown in Fig. 8) when the plug is inserted in the jack the sleeve of the plug makes contact with the ring B, while the tip of the plug slides over the ridge rolled in the ring and makes contact with that ring by the pressure exerted by the flexible conductor c6.

BATTERY TRANSMITTER.

J. S. Goldberg, of Chicago, Ill., patents (No. 747,602) and assigns to the Stromberg-Carlson Telephone Mfg. Company an improved battery transmitter. The object of the inventor is to provide an improved means of securing the diaphragm and a better method of regulating the pressure upon the carbon granules. The invention is shown in Figs. 1 to 5 inclusive. The transmitter case is formed of two contacts having overlapping flanges 2 and 3 secured by the screws 4. The diaphragm 6 is held in place by

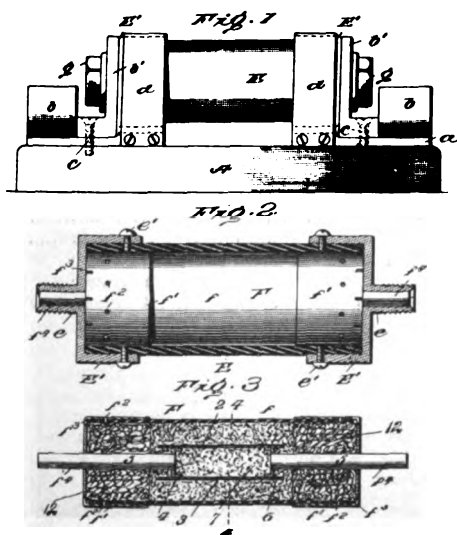
means of a capping device 7 having a sloping surface. One section of the transmitter casing is provided with a thread 7', into which a follower 8 is screwed that forces the diaphragm holder 7 against the diaphragm and locks it into place. The diaphragm forms the front electrode. The rear electrode is provided with a threaded stem 16 which engages with an extension 17. The electrode or its stem has fastened thereto the spring base 18, subdivided into four



arms with enlargements at their ends. These arms engage the follow or other ring that encloses the granular carbon, and forces it against the diaphragm. By this means improved adjustability is attained, and a constant and uniform pressure exerted upon the follow ring.

IMPROVED FUSIBLE CUT-OUT.

L. W. Downes, of Providence, R. I., patents (No. 746,050) an improved fuse and assigns to the D. & W. Fuse Company, of Providence. The object of the invention is to provide a fuse which is more reliable and more sensitive than those ordinarily upon the market. The essential features are illustrated in Figs.

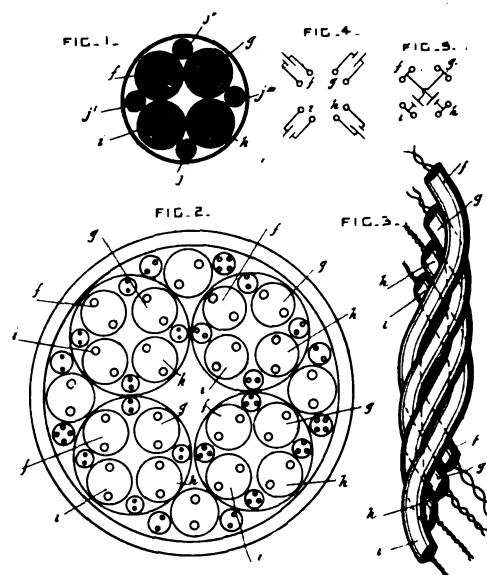


1, 2 and 3, in which Fig. 1 is an elevation, Fig. 2 a section of the case, and Fig. 3 a vertical section. *A* is a base of porcelain upon which the terminals *A* are secured. The fuse consists of two caps *e'*, which enclose a case *e* made of fiber or some similar non-conducting material. Through the caps a substantial terminal *f* is inserted. These terminals extend to the center of the case and are there attached to a tube 3, which is made of lead alloy or some similar fusible metal. The wires are firmly

and substantially secured by means of the annular brackets 4. The fuse which is thus formed is, therefore, circular and hollow and can radiate its heat very rapidly. It also may be perforated in the center with holes, so that the portion of the fuse which fuses is limited to that part which is in the metal. The whole of the case may be filled with plaster of Paris or some other extinguishing material.

IMPROVED TELEPHONE CABLE.

Francis Tremain, of Highgate, England, patents (No. 747,515) an improved telephone cable. This is illustrated in Figs. 1, 2 and 3. Fig. 1 shows a small-sized cable. In this illustration the inventor takes eight pairs of wires, each pair he twists one about the other, and insulates them as shown in the cross section. Four of these pairs are arranged at a considerable distance from each other. Each wire of the other four is placed in relatively close proximity to each other. Thus the inventor has an aggregate composed of four pairs whose ends are widely separated, and four pairs whose ends are close together. He then twists these various pairs together among themselves and by this means obtains a cable that is diagrammatically shown in Figs. 4 and 5, in which *f*, *g*, *h* and *i* are the wires, the relative capacities being symbolized by the sign for a condenser. In this way the inventor provides a cable in which part of the circuits are advan-



tageously arranged for long distance conversations and part are designed for local work. To make a large cable the inventor takes a number of small wires, as shown in Fig. 2 and twists them together in a similar manner.

WHAT LIGHTNING REALLY IS.

ALFRID HANDS, before the Fire Prevention Congress, in London, after showing that more than 300 buildings were struck by lightning each year in England said: "At the best lightning is too often regarded as an electric current overcoming the resistance of the air; but I want you to regard it as a breakdown of the dielectric—not as something leaving the sky to come to earth, or as being hurled from the clouds to strike a building, but to consider it—as it indeed is—as a fracture or cracking both of the air and of any other resisting medium between the oppositely charged bodies, the clouds and the earth. Now when the stress to which the air is subjected has reached the breaking point, the line of the fracture becomes visible by the intense heat making the air particles momentarily incandescent, and this we call 'lightning.' The building, which being in the line of the strain gets damaged, forms only a part of the fracture; the air is equally damaged but is a self-repairing medium. Unfortunately, our buildings, trees and bodies, which are less resisting than the air, are not self-repairing, and so we get the deplorable losses of life and property that occur every year."



FINANCIAL

BOONE, IA.—The stockholders of the Boone County Telephone Company have voted to increase the capital stock from \$75,000 to \$150,000.

LE MARS, IOWA.—The Le Mars Telephone Company has filed amended articles of incorporation to permit of selling shares of stock of \$50 each instead of \$100. The capital of the company is \$50,000.

CROYDEN, N. H.—The Croyden Telephone Company has declared a dividend of 10 per cent., 6 per cent. to be paid to stockholders and 4 per cent. to be held in reserve.

NORTH BARNSTEAD, N. H.—The Union Telephone Company, of North Barnstead, has increased its capital stock by \$1,500.

DAUPHIN, PA.—The board of directors of the Dauphin Telephone Company have declared a 2 per cent. dividend. The last year has been exceedingly prosperous for the company, and prospects for the next year are very encouraging.

PHILADELPHIA, PA.—The Keystone Telephone Company has completed a full calendar year of operations, 1903. The net earnings reported by the company for the calendar year ended December 31, 1903, (December partly estimated) are \$230,418, which is twice the amount required to pay a 5 per cent. dividend on the \$2,500,000 preferred stock. No further steps have been taken about a bond offering.

LOS ANGELES, CAL.—At a meeting of the board of directors of the Home Telephone & Telegraph Company, of this city, held at the office of the company, the first regular quarterly dividend at the rate of four (4) per cent. per annum, being one (\$1.00) dollar per share, was declared out of the surplus earnings of the company for the quarter ending December 31, 1903, to stockholders of record at the close of books, February 1, payable February 10, 1904.

FRANCHISES

WAKEFIELD, NEB.—The city council has granted a franchise to the Wakefield Home Telephone Company, of which Mr. Bartlett is the proprietor. He promises to have 60 telephones in the city and 50 in the country in operation within six months.

LORAIN, O.—Mayor King has vetoed the ordinance granting to the Ohio Telegraph and Telephone Company, said to be a Bell company, the right to operate a telephone system in this city. The franchise was passed by the council December 24. The general public has been very much excited over the action of the council, as sentiment was strongly against it.

PITTSBURGH, PA.—The ordinance granting the Consolidated Telephone Company a franchise in this place has been passed on second reading.

PORTE VUE, PA.—An ordinance granting the Pittsburgh and Allegheny Telephone Company a franchise in this town has been passed on second reading. The company has been given permission to commence work subject to the provisions of the ordinance.

SAN ANTONIA, TEX.—The Summerset & San Antonio Telephone Company has filed a petition to the city council asking for right-of-way into the city. A good deal of material has been purchased for the new system, which will take in Summerset, Lytle, Senior and San Antonio.

SALT LAKE CITY, UTAH.—The county commissioners have granted a 50-year franchise to the new Utah Telephone Company to construct its lines throughout the county. Business telephones under the ordinance will be \$24 a year and residence telephones \$15 a year. The company is required to give a bond of \$10,000 that work will begin within 60 days, and five miles of wire must be strung in six months. The county gets three telephones free.

COMBINATIONS

DALLAS CITY, ILL.—Oscar Cranberg has purchased the Scott Bros. Telephone Exchange in this city.

BRYANTSVILLE, IND.—O. C. Bryant, of this place, has purchased the telephone line between here and Mitchell.

ELECTIONS

COLUMBUS, GA.—At a meeting of the directors of the Columbus Automatic Telephone Company Joseph L. Renfro, of Opelika, Ala., was elected manager of the company's exchange, which will open for business at an early date.

ALEXIS, ILL.—The farmers telephone lines north and east of this place have consolidated and have elected the following officers: D. W. Sedleck, president; Wm. McAtee, vice-president; Wm. Terry, secretary, and John Mack, treasurer.

SILVER LAKE, IND.—The People's Mutual Telephone Company has elected the following officers: Arthur Smith, president; Henry L. Oldfather, secretary and general manager; H. W. Klein, treasurer. This company has been in operation less than two years, and is now operating five exchanges with 525 subscribers. It is in a prosperous condition.

CLARINDA, IOWA.—The Farmers Mutual Telephone Company has elected the following officers: John Groeling, president; Frank Alexander, vice-president; J. E. Sawhill, secretary; John Fleener, treasurer; John Groeling, Louis Annan and J. E. Sawhill, directors.

LA PORTE, IA.—The Central Iowa Telephone Company has elected the following officers: James R. Skinner, president; J. H. Funk, vice-president; W. V. Shipley, secretary and treasurer, all of Iowa Falls, with the exception of Mr. Skinner, of La Porte. The directors are as follows: P. C. Dings, Jos. Husman, E. Duke Moor, of La Porte; J. H. Funk, R. C. Kennedy, of Iowa Falls, and George L. Stearns, of Eagle Grove.

MAXWELL, IA.—The Maxwell Telephone Company has elected the following officers: F. G. Ainley, president; C. H. Johnston, secretary; F. G. Ainley, treasurer; Joseph Prawl, general manager.

MAYSVILLE, KY.—The Maysville Telephone Company has elected the following officers: Walter Matthews, president; Sanford Mitchell, vice-president; Dr. Edward Matthews, secretary, treasurer and general manager; Walter Matthews, Sanford Mitchell, D. L. Pendleton and J. W. Chambers, directors.

WHITE CLOUD, KAN.—The new telephone company which will operate in this vicinity has elected the following officers: D. Derrick, Elmer Parker, Doc Ulah, D. V. Utt, Lewis Pohl, Wes Moore, Arch Hamaker, and John Walters.

BAR MILLS, ME.—The annual meeting of the Saco River Telephone & Telegraph Company was held at the office of the Centrifugal Leather Company here recently. The following directors were elected: Frank H. Hargraves, West Buckston; J. Barriman, West Buckston; S. B. Shepherd and Martin Coffin, of Bar Mills; Andrew Chadbourne, Waterboro; C. P. Harman, West Buckston. Frank Hargraves was elected president; M. Coffin, vice-president, and E. A. Hobson, of West Buckston, secretary, treasurer and superintendent.

MANSFIELD, O.—The Mansfield Telephone Company has elected the following officers: S. N. Ford, president; J. L. Baxter, vice-president; D. M. Ward, secretary and treasurer. J. L. Baxter, B. J. Balliett, A. B. Beverstock, Frank Bloor, Lewis Brucker, F. M. Bushnell, Reid Carpenter, A. L. Cameron, S. N. Ford, E. J. Gilbert, C. H. Keatny, W. E. Loughried, Berton Preston, C. W. Upson and J. A. Rigby, directors.

POCOHONTAS, PA.—The Economy Telephone Company, of Greenfield township, held a meeting here recently and elected the following officers: A. G. Yutz, president; Wilson Paul, secretary; S. K. Hochstetler, treasurer; E. K. Hochstetler, E. J. Loriach, Harvey Berkeley, W. N. Moser, John Engle and Harvey Miller, directors.

YORK, PA.—The York Telephone Company has elected the following officers: D. A. Lafean, president; John McCoy, vice-president; H. H. Weber, secretary; C. C. Frick, treasurer; George B. Rudy, superintendent; George S. Schmidt, attorney. A dividend of 2 per cent. was declared.

PLATT, S. D.—In view of the fact that the local telephone system has been sold to the Missouri River Telephone Company, the local stockholders held a meeting and elected the following officers: T. E. Andrews, president;

THE WEEK'S MESSAGES—Concluded.

E. C. Ward, secretary and treasurer. The system will be overhauled and some additions made.

ST. ALBANS, VT.—The Franklin County Telephone Company has elected the following officers: Jasper W. Keller, president; J. H. Abbott, vice-president; Silas W. Flinn, secretary; E. W. Longly, auditor, and M. P. Abbott, manager. The directors are F. W. Story, Jasper N. Keller, M. B. Jones, and Carl T. Keller, of Boston. E. C. Smith, H. G. Morton, J. H. Abbott, M. P. Abbott and C. S. Beeman, of this city.

BARABOO, WIS.—The Baraboo Telephone Company has increased its rates to \$2.00 a month for business telephones and \$1.25 a month for residence telephones. The company was organized eight years ago, with 75 subscribers, and to-day has 400 city telephones and 200 rural telephones.

PERSONAL

JOHN BECK, who for the past two or three years has been in charge of the Central Union Telephone plant at Cairo, Ill., has been transferred by the company to take charge of its plant at Kokomo, Ind.

HUNT CHIPLEY, of Atlanta, Ga., has been placed at the head of the legal department of the Southern Bell Telephone and Telegraph Company, and the headquarters moved from New York City to Atlanta.

FLEMING JONES, manager of the Southern Bell Telephone Company's office in Huntington, W. Va., has resigned to go into the traffic department of the same company. He has been succeeded by E. W. Clouston.

JOHN F. MORGAN, formerly superintendent for the Consolidated Telephone Company, at Allentown, Pa., has been made superintendent of the same company at Scranton. Mr. Morgan is succeeded by Frank S. Lewis. As local superintendent he has charge of the exchanges from Mauch Chunk to Fort Washington, including such important exchanges as Allentown, Cata-sauque, Lehighton, Slatington, Norristown, and numerous smaller ones, besides the toll lines extending between these cities.

ROBERT H. POLK, general manager of the People's home Telephone Company's system in Birmingham, Ala., has resigned. He is succeeded by

W. B. Harper, former cashier and auditor. Mr. Polk leaves here to go with the Memphis Telephone Company, of Memphis, Tenn., as vice-president and general manager. Mr. Polk did much to make the People's Telephone Company popular in Birmingham, and its patrons will regret to know that he is to leave. At the same time it is gratifying to know that he goes to a larger field and leaves a good man in his place.

C. F. VALE, formerly with the Wisconsin Telephone Company, has accepted a position as manager of the Ripon Telephone Company, of Ripon, Wis.

MISCELLANEOUS

SALEM, ARK.—The Hynson Brothers' telephone exchange was almost totally destroyed by fire, which swept the business section of Salem.

SOUTH BEND, IND.—Daniel Williams, president of the Minnesota Valley Farmers' Mutual Telephone Company, states that it is proposed to change the company from a mutual company to a stock company, in order to provide funds for new construction.

OLATHE, KAN.—The managers of the Independent telephone lines of Johnson County, met in Olathe recently and organized a county association. The companies represented have 1,200 telephones in use in the county.

GRAND CANE, LA.—The exchange of the De Soto Telephone Company was almost totally destroyed by fire. The loss is placed at \$2,000.

SHAW, MISS.—The Columbia Telephone Company's exchange here suffered a loss by fire.

UTICA, N. Y.—The Utica Home Telephone Company is about to issue a new directory which will contain the names of 2,300 subscribers.

TRUMBULL, O.—At a joint meeting of delegates from Cork, Thompson, Trumbull and Hartsgrove Telephone Companies, recently held at Trumbull, the first step was taken toward forming a telephone association committee to draft constitution and by-laws for such an association.

WESTERLY, R. I.—The exchange of the Westerly Automatic Telephone Company was damaged by fire. The property was uninsured.



New Construction in the Field



STAFFORD SPRINGS, CONN.—The people of Stafford Springs are talking of organizing an Independent telephone company to construct a local exchange.

FAIRFIELD, ILL.—The Egyptian Telephone & Improvement Company, composed of J. H. Morlan, C. M. Brock, Luke Whitson, J. M. Ruggles and F. M. Brock, organized for the purpose of promoting and building farm telephone lines in this and adjoining counties, are planning to give the patrons of their lines throughout the country a service that will be second to none in the State. When their plans are completed and the lines connected with the exchange at Fairfield, it is their intention to give each day the market reports on cattle, hogs, grain, etc., the weather forecasts, the standard time, and the local prices on country produce; also any important events that may occur in any part of the civilized world that would be of interest to the people in general. They are arranging to give their entire telephone system a strictly up-to-date service, both night and day.

FALL CREEK, ILL.—A company to be known as the Central Telephone Line will construct a system between Fall Creek and Payson. W. S. Martz, of Fall Creek, is president.

FREMONT CENTER, ILL.—The Farmers' Telephone Company, of Fremont, is constructing a line to Dillon. About 125 farmers living in Hope-dale, Minier and Delavan are still stockholders in the new company.

ANTHON, IA.—The Maple Valley Telephone Company will expend \$1,000 in improvements and extensions.

DE WITT, IA.—The De Witt Telephone Company will extend its lines.

ESTHERVILLE, IA.—As a result of an increase in the rates of the Western Electric Company, over 150 of its patrons have signed a petition to discontinue their telephones. They contemplate organizing a company, securing a franchise from the city council and constructing a new local system, to connect with the E. H. Martin Company at Ft. Dodge. It is announced that it would not be a difficult matter to secure a franchise from the council.

JEFFERSON, IA.—At a recent meeting of the Green County Farmers' Mutual Telephone Company it was decided to build a new through toll line from Jefferson to Paton, stringing wires part way on the poles of the Paton & Dawson Mutual Companies. The new exchange here will have 175 telephones to start with.

DETROIT, KAN.—The Farmers' Mutual Telephone Company is being organized by the farmers north of this place. At a meeting held at the Harmonie school house recently it was decided to have the exchange in Detroit. There are about forty subscribers already.

LEOTI, KAN.—Residents of this place are organizing a local telephone company and will have an exchange here. It is probable that a line will be constructed to Tribune.

ABILENE, KAN.—A new mutual telephone company of forty farmers near this city has been formed, and is to connect its lines with the central line, that reaches every postoffice in the county. Over 200 farmers in this county alone have telephones, and the number is increasing every day.

MERCER, ME.—The North Sheron & Noridgwock Telephone Company recently raised its rates from \$10 to \$12 a year. As a result, over a hundred of its subscribers have ordered their telephones discontinued and are organizing a new telephone company to supply them with service. A meeting was held here recently, at which representatives from Noridgwock, Rome and Smithfield were present. The meeting was called to order by C. K. Allen, who was elected chairman. H. T. Crosswell was elected secretary.

ESCANABA, MICH.—George Finch, proprietor of the Finch Independent Telephone Company, operating here, will extend his toll lines from Delta County to Menominee and Cedar River. Mr. Finch also intends to apply for a franchise to construct and operate a telephone system at Menominee.

KALAMAZOO, MICH.—The Citizens Telephone Company will expend \$25,000 constructing new lines, exchanges, etc.

PLAISTOW, N. H.—The employes of the People's Telephone Company, of Haverill, are stringing wires through the village. For the present there will be a station at the post office.

WENONAH, N. J.—The People's Mutual Telephone Company, with headquarters here, will begin the construction of its line as soon as the weather is favorable.

CATSKILL, N. Y.—The West Shore Home Telephone Company has made connections from Smith's Landing to Saugerties, and Manager Cornwell says that in three weeks connections will be made from this village to Saugerties, Kingston, Poughkeepsie, Newburgh and the Walkill valley.

WATERLOO, N. Y.—The Home Telephone Company has added many new subscribers to its lists in Waterloo and Seneca Falls, and has secured the right-of-way between Waterloo and Geneva, and will soon commence the construction of a line. The company has arranged to connect there with a line to Buffalo.

PITTSBURG, PA.—The stringing of wires for the new telephone system which the Pennsylvania Railroad Company is erecting between Pittsburgh and Philadelphia has been completed over the Pittsburgh division, and the system will be put in service in a short time.

BOOK REVIEWS

THE MECHANICAL ENGINEERS' REFERENCE BOOK is a handbook of tables, formulae, and methods for engineers, students, and draftsmen, by Henry Harris Suplee. J. Lippincott & Company, Philadelphia and London: 834 pages, profusely illustrated. Net price, with thumb index, \$5.50; without index, \$5.00.

This volume is the latest addition to a library of engineers' handbooks that have been growing for nearly a quarter of a century. Older practitioners well remember when Henck's Field book was the sole occupant of this field of literature. Then came Trautweim, Nastrum, and Haswell, and later pocket books multiplied until now there are so many specialized handbooks addressed to the different members of the engineering profession that at first sight there appears hardly room for another one. Nevertheless the volume under consideration is unique in its way, and possesses so many meritorious features that it needs but a slight acquaintance to become a valued addition to one's library of handbooks. It is not an attempt to make an encyclopedic text book, for explanations are conspicuously not present. The author addresses himself not to students but to practicing men, and endeavors to supply them with a collection of data to retain which would transcend the most retentive memory. The book opens with a somewhat novel multiplication table that endeavors to abridge this most irksome of mathematical processes. Then comes a table of factors giving the primes of all numbers from 1 to 9,500. The tabular matter then embraces the usual tables of powers and roots, mensuration and logarithms, together with extensive conversion tables from English to metric systems, and vice versa. These are all particularly valuable owing to the rapid increase in the use of the French system. Logarithms and logarithmic trigonometrical functions succeed. The stresses in framed structures are dealt with graphically, in a concise and yet lucid manner. Next come the properties of various materials, such as the weights and dimensions of chains, ropes and the various roll-shapes, such as channels, anchors and Z bars. The fundamental principles of rope transmission are noticed and water wheels receive a fair assignment of space. About a hundred pages are extended upon steam engineering, while gas and oil engines do not escape attention. Here a valuable feature is found in a complete compendium of rules for the testing of all sorts of engines. At the latter part of the volume something like a hundred pages are devoted to electrical engineering, to which is devoted a chapter upon the cost and power and the maintenance expense of such installations. The author has kept strictly to his prefatory promise in compiling a volume directed to the wants of mechanical engineers. Much care is displayed in its arrangement. The typography is excellent, the binding strong and substantial, with a convenient edge reference index. To call it a pocket book is a misnomer, for it is too bulky for anything but the most capacious pockets. But as a desk companion the office engineer will give it a warm welcome.

TRADE NOTES

* **THE SAND POINT CEDAR COMPANY**, of Sand Point, Idaho, is the name of a new firm which grows out of the old firm of Butler & Culver. The company handles posts, poles, piling, ties, cordwood, etc. Mr. W. H. Keerman, secretary of the new firm, was formerly in business under his own name in Sand Point and is well known in the trade.

THE CHICAGO FUSE WIRE & MFG. COMPANY, of 358 Dearborn street, Chicago, has issued its catalogue No. 15. To the telephone man protection of electrical circuits is an interesting and ever present question, and in this catalogue will be found an extensive list of the various sizes and kinds of fuse links manufactured by the company and an enumeration of the various enclosed or "cartridge" fuses which it

places upon the market. The catalogue is extensive and explicit in giving all of the dimensions and prices of the various articles offered.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, of Chicago, reports the following as some of its holiday shipments: Monroe, S. D., 100 line Express; Holden, Mo., two 100 line Express; Pittsburg, Pa., 25 line Express; Maryville, O., 100 line Express; Jamaica, N. Y., 100 line Express; Tyler, Minn., one 100 line Express; Neodesha, Kans., one 100 line Express; Hotchkiss, Colo., one 100 line Express; Wheeler, Ind., one 100 line Express; North Platte, Neb., one 100 line Express; Garden City, Kans., one 200 line Express.

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, Ill., announces that the automatic exchange of five thousand stations was cut into service at Grand Rapids, Mich., on Saturday last at 12.30 P. M., seven minutes being consumed in making the change from manual to automatic. It is claimed that the volume of calls coming in immediately after the change was four times greater than before. The Citizens' Telephone Company, of Grand Rapids, is now operating more automatic telephones than any other company in the world.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION—Wanted in an exchange of not over 200 to 250 subscribers, in Missouri preferred, by a telephone man with a technical education. Address, Box 123, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 123

POSITION—Wanted, by young married man a position as manager or foreman of construction. Wife understands switchboard operating. Was for 5 years manager for Independent company. Best of references. Address, Box 125, Walhalla, S. C. 125

POSITION—Wanted by telephone man with eight years' experience with Bell and Independent companies. Best of references from present and former employers regarding work and character. 26 years of age; married; strictly temperate. Address Box 120, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 120

POSITION—A first-class construction man with thirteen (13) years' experience in telephone (both Independent and Bell) and electric light work, desires connection with a telephone company in its construction department. Address, Box 99, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 99

INVESTOR wanted to furnish necessary capital for developing good paying telephone property to be managed by an experienced telephone engineer. Will accept nominal salary and equity in plants for services. Address Box 73, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 73

MANAGER—A good, live, energetic, capable man of experience wanted to manage a large Independent telephone system in the West. Must be able to invest not less than \$10,000 in the company. Address Box 102, **THE AMERICAN TELEPHONE JOURNAL**, No. 116 Nassau street, New York City. 102

POSITION—Wanted, a position as manager, purchasing agent or both, with an Independent Telephone company. Good references. Am now salesman with large supply house and familiar with all factory costs. Can save you money on your purchases. No objection to location. Can accept Feb. 1. Will consider an offer as salesman of electrical supplies. Address, Box 124, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 124

ARE YOU GETTING WHAT YOU PAY FOR?

If your Poles don't come quickly, if there are mistakes in the shipment, if the Poles aren't up to the standard, you're not, and they don't come from us.

Perfect service is just as important to you as to others. Let us give you prices before you order.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

48 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Digitized by Google

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

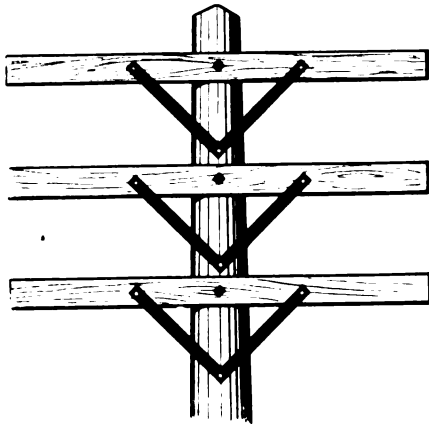
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

A cross arm brace doesn't seem like much of a thing to make but we take as much pride in making an arm brace well as a watchmaker does a watch. We make lots of 'em, therefore can save you money. We have our own plant, do it all ourselves. Write us for prices.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

PRODUCERS NOT JOBBERS

CEDAR POLES

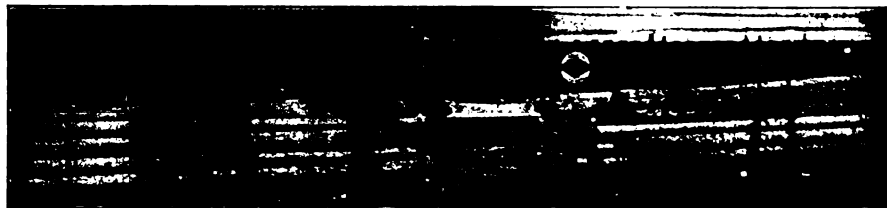
LOWEST PRICES
IN CARLOAD LOTS

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 J. GREEN ST. CHICAGO.

Cedar Poles

Large Stock
Prompt Ship-
ment.



LONG
POLES
A
SPECIALTY

JOHN H. FOWLER, General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and Milwaukee, Wisconsin.

FOWLER-JACOBS CO.
ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

CEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

TIES

YELLOW PINE STOCK.
100,000 6" x 8" x 8 FEET.
Chestnut and Oak, large stock, standard sizes.

Manufactured by

ECCLESTON LUMBER CO.,

29 Broadway, NEW YORK.

POLES

(Southern White Cedar) long leaf Yellow Pine, octagonal and square, Chestnut and Cypress.

YELLOW PINE CROSS ARMS,
PINS AND BRACKETS.

Prompt deliveries from stock, New York city yard, or direct from mills.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND



Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter and complete Telephone Sets. Send for booklet.

74 CORTLANDT STREET,

NEW YORK CITY

The Morse

Cedar
Co.

CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.

Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

POLES
POLES
POLES
POLES

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.



J. W. Middleton & Co.

PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets
Toll Station Journals
Toll Station Ledgers
Monthly Check Reports
Receipts for Toll Service
Receipts for Exchange
Service
Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

PLATINUM

SHEET and WIRE for all purposes and all shapes in any quantity.

Special Rates for Refining and Reworking Platinum or anything that contains Platinum. Highest Prices Paid for Scrap Platinum.

CROSELMIRE & ACKOR,

Manufacturers and Importers of Platinum of all kinds.
Factory and Main Office, NEWARK, N. J., 42 Walnut St. N. Y. OFFICE, 10 E. 23d St., Room 8.

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

ELECTRICAL ENGINEER
AND CONTRACTOR
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

... Plans, Specifications and Estimates Promptly Furnished ...

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



Okonite Wires, Okonite Tape,
THE OKONITE CO., Ltd.

WILLARD L. CANDLER, } Managers
E. DURANT CHEEVER, }

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Manson Tape, Candee Weather-Proof Wire

SOLE MANUFACTURERS
283 BROADWAY, NEW YORK

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

ADVERTISERS' DIRECTORY—Continued**INSULATORS.**

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C. & Co., Montreal, Can.

MAGNET STEEL.

Leslie, A. C. & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Eccleston Lumber Co., New York.
Elkin Machine Co., Elkin, N. C.
Nagel, W. G., Electric Co., Toledo, O.

PLATINUM.

Croselmir & Ackor, Newark, N. J.

POLES.

Bissell Co., The F., Toledo, O.
Beider, Francis & Co., Chicago, Ill.
Eccleston Lumber Co., New York.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Lindsay Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C. & Son, Monroe, Mich.
Townsend Cedar & Supply Co., Chicago, Ill.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C. & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARD DROPS.

Columbia Electric Co., McCordsville, Ind.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Conn. Tel. & Electric Co., Meriden, Conn.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

YELLOW PINE CROSS ARMS**WE MAKE 'EM****AT FACTORY****Chattanooga Tenn., U. S. A.**

Below find price lists of

TELEPHONE ARMS**F. O. B. Factory**

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	26		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	28 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.**CHATTANOOGA, TENN., U. S. A.****IT'S SO EASY TO TEST***With one of my special instruments.*

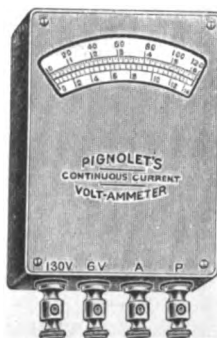
The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.

It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.

**LOUIS M. PIGNOLET****Originator of the Voltmeter Habit****80 Cortlandt Street ... New York City**

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 40.

Important **THERE WILL BE SOLD UNDER THIS SPECIAL OFFER A Limited Number Only**

of Specifications for Building and Operating Exchanges and Toll Lines with description and dimensions of material required. The following **Set of Specifications—\$2.00—delivered.** Regular price, \$10.00.

SINGLE COPIES

Specifications for Installing Telephones and Inside Wiring,	\$1.00—Special Offer \$0.25
Building Pole Lines for Local Construction,	2.50— " " .50
Wiring and Equipping Cable Poles,	1.00— " " .25
Making Cable Splices,	1.00— " " .25
Making Cable Terminals by Pot Head Splices	1.00— " " .25
Cable Box and Cable Box Fitting,	1.00— " " .25
Making Connection from Pole to Subscriber's Station,	1.00— " " .25
Equipping Poles and Placing Crossarms,	1.00— " " .25
Guying Pole Lines in Cities or Towns,	1.00— " " .25
Building Toll Lines	2.50— " " .50

The above Specifications contain a detailed description covering the **Construction of Telephone Exchanges and Toll Lines** as well as a **Description and Dimensions of Material Required.** (CASH MUST ACCOMPANY ALL ORDERS)

Combination Subscription Offer

A complete set of the specifications (\$2.00) and a year's subscription to THE AMERICAN TELEPHONE JOURNAL, 52 weekly numbers (\$1.00) can be had for a limited time for \$2.50.

AMERICAN TELEPHONE JOURNAL, 116 Nassau Street, New York City.

Enclosed find \$.....for which please forward those specifications marked "1" at the special price.

(State here if combination subscription order is wanted).....

Name in Full.....

Street and No.....

Town.....

State

1903

THE
NORTH WESTERN
LINE

California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.

THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.

THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.

W. B. KNISKERN,
Passenger Traffic Manager,
Chicago.



THE
ALTON'S
1904
COW-BOY
GIRL

TRADE-MARK.

"Sequel to the Fencing Girl."

Copyright, 1903, by
Chicago & Alton
Railway.

ART CALENDAR

Four graceful poses from life; figures ten inches high, reproduced in colors by a process far superior to last year's calendar. Highest example of lithographic art.

"THE ONLY WAY"

to own one of these beautiful calendars is to send twenty-five cents with name of publication in which you read this advertisement, to GEO. J. CHARLTON, Gen'l Passenger Agent, Chicago & Alton Railway, CHICAGO, ILL.

The best railway line between CHICAGO, ST. LOUIS, KANSAS CITY and PEORIA. Take the "Alton" to the St. Louis World's Fair, 1904.

To Uppor Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,

CHICAGO, ILL.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL **Special Wire** FOR EVERY PURPOSE


THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Insulated
Electrical
Wires and Cables



John A. Roebbling's Sons Co.

TRENTON, N. J.

Bare Steel and
Copper Tele-
phone Wire

NEW YORK
SAN FRANCISCO

Agencies and Branches

CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

SUBSCRIPTION BLANK

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)

Subscription for One Year.

Name.....

P. O. Address.....

Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, **and at much less cost.**

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process. This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

VITRIFIED CLAY SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Concluded.

TELEPHONE HOLDER.

Chicago Writing Machine Co.,
Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chi-
cago, Ill.
Automatic Electric Co., Chicago,
Ill.
Barr, W. J., Mfg. Co., Cleveland,
Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St.
Louis, Mo.
Chicago Writing Machine Co.,
Chicago, Ill.
Columbia Electric Co., McCords-
ville, Ind.

Connecticut Telephone & Electric
Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Electric Appliance Co., Chicago,
Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New
York.
Holtzer-Cabot Elec. Co., Brook-
line, Mass.
International Telephone Mfg. Co.,
Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Leslie, A. C. & Co., Montreal, Can.
Monarch Tel. Mfg. Co., Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
North Electric Co., Cleveland, O.

Sterling Electric Co., Lafayette,
Ind.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.
Swedish-American Tel. Co., Chi-
cago, Ill.
Vought-Berger Co., La Crosse,
Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.

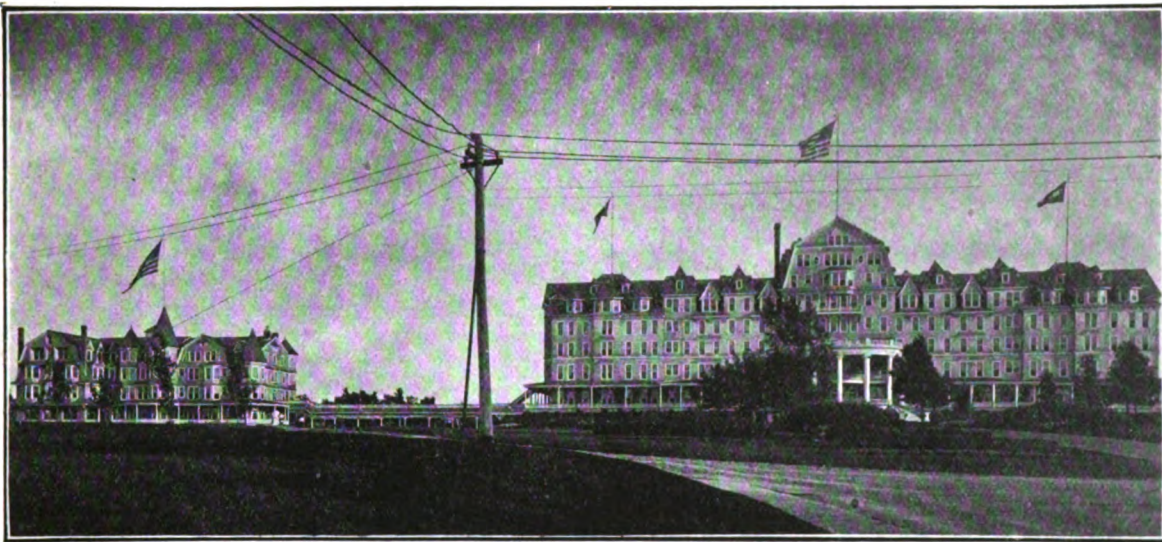
TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland,
Ohio.

WIRE.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Croselore & Ackor, Newark,
N. J.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
National Wire Corporation, New
Haven, Conn.
Okonite Co., New York.
Roebling's Sons Co., John A.,
Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co.,
Pittsburg, Pa.

*Aside from disfiguring the view of public and private buildings, **OVER-HEAD** electric systems are dangerous to life and property.*



A FINE LANDSCAPE SPOILED.

*The use of **BITUMINIZED FIBER CONDUIT** makes **UNDERGROUND** systems practical for electric light, power, telegraph and telephone lines. It is water, gas and electrolysis proof. Easily laid and maintained. The only conduit sold with a guarantee against electrolytic action.*

An illustrated booklet free.

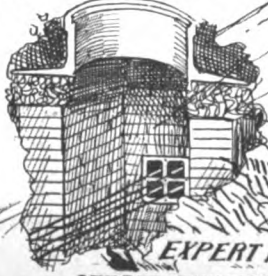
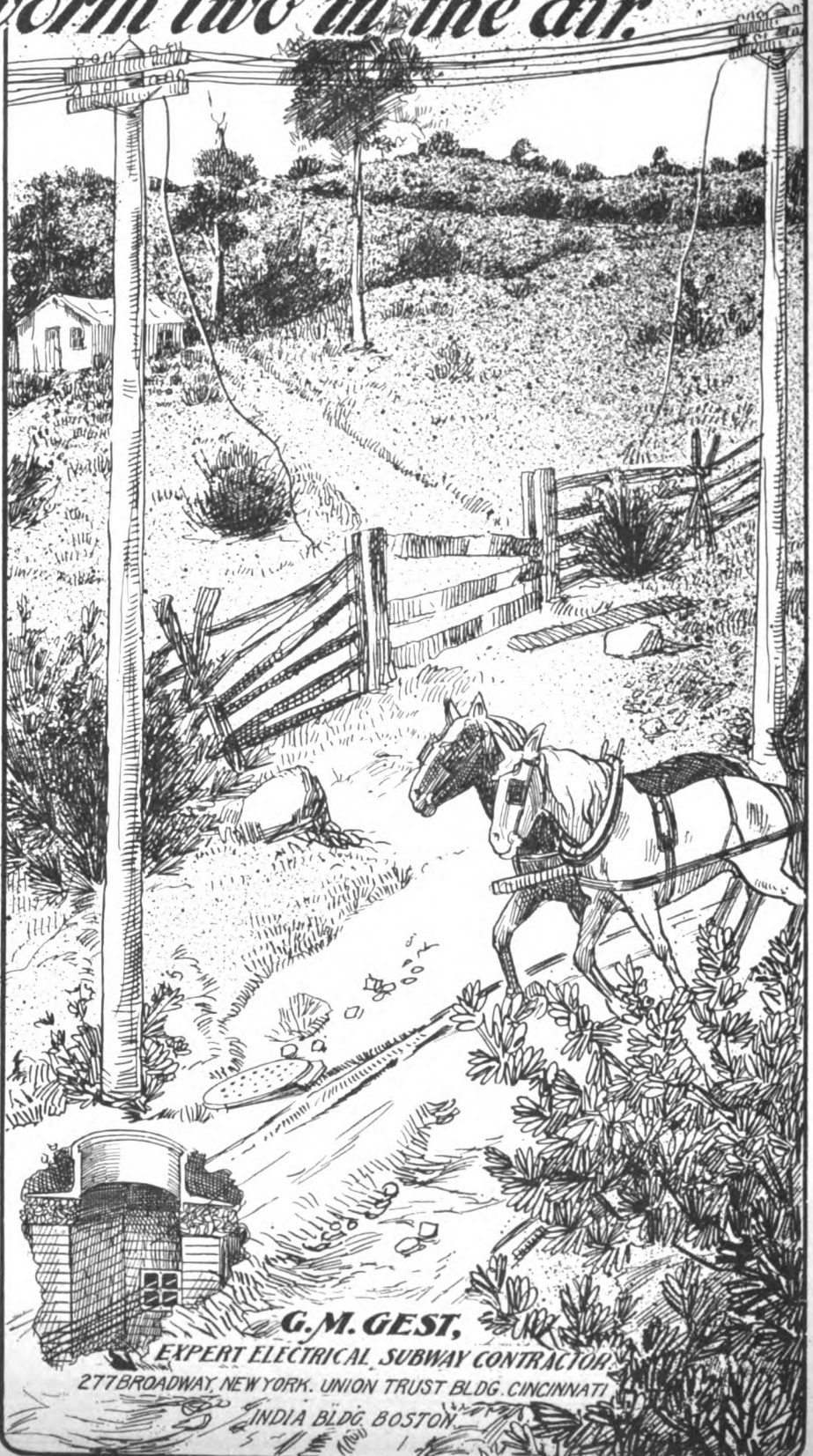
American Conduit Company

170 Broadway,
NEW YORK.

822 Manhattan Building,
CHICAGO.

336 Macy Street,
LOS ANGELES.

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,
EXPERT ELECTRICAL SUBWAY CONTRACTOR
277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI
INDIA BLDG. BOSTON.

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

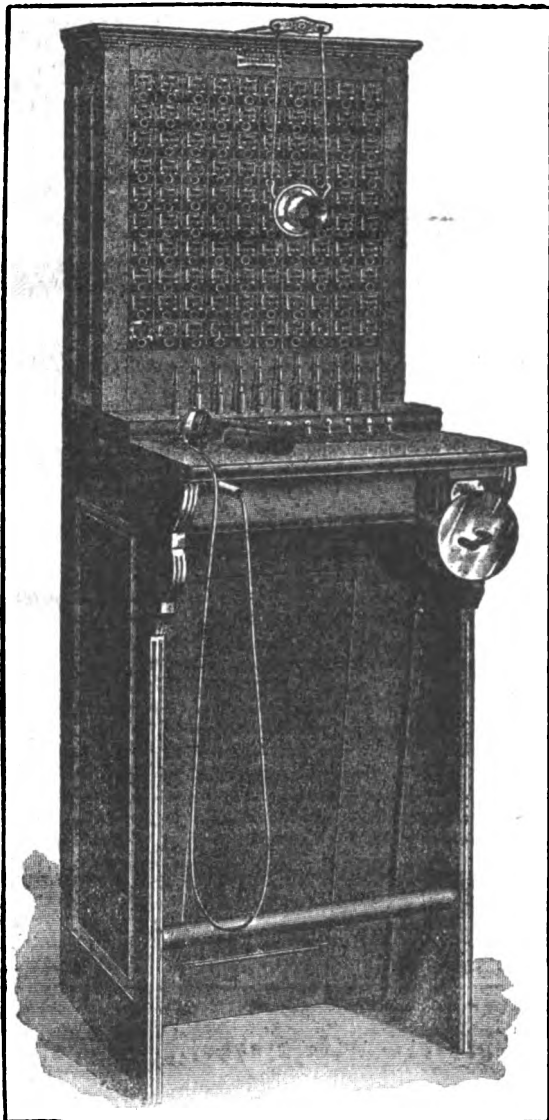
Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

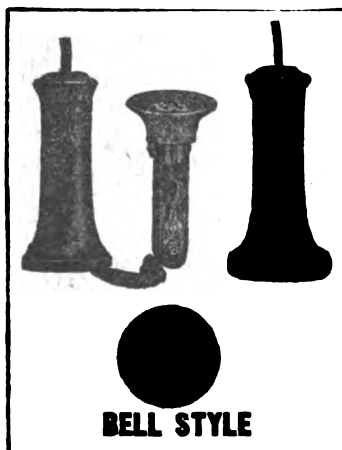


250,000

American Express Drops In Use

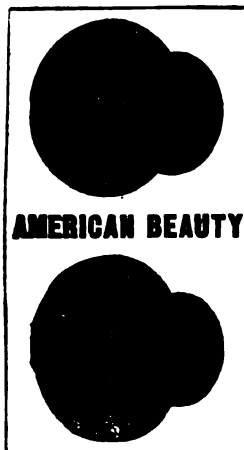
There Must Be a
Reason For It

WE MAKE OTHER GOOD THINGS



BELL STYLE

**NEW
CATALOGUE**



AMERICAN BEAUTY

**NEW
CATALOGUE**



VICTOR RINGER

American Electric Telephone Co.

CHICAGO

THE AMERICAN TELEPHONE JOURNAL

Many Men of Many Minds

*except as to the value of THE AMERICAN
TELEPHONE JOURNAL—then all agree.*

• • •

"We find your Journal an invaluable aid in our business, the scientific articles being especially of great value.

Homer W. Schofield, Mgr. THE ALAMO TELEPHONE CO.,
Alamogordo, N. M.

Your paper is all right. I find the diagrams, etc., very helpful in my business.

M. F. LIEBEY, Electrician,
Whitfield, N. H.

It is the ideal Journal for telephone workers.

F. S. LAMBERSON,
Union City, Ind.

Assuredly the best telephone paper in the field.

MORGAN COUNTY TELEPHONE CO.,
W. L. Haskell, Sec'y. New Decatur, Ala.

• • •

One thousand five hundred of these unsolicited testimonials could be given—each one a good reason why every man really interested in telephony should own a year's subscription—

52 ISSUES FOR \$1.00.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by **WILLIAM HENRY McDONOUGH**

Volume 9 NEW YORK—JANUARY 23, 1904—CHICAGO Number 4

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

ELEMENTS OF THE TELEPHONE.....By B. C. Wilhelm

THE CLARKSVILLE COMPANY'S NEW EXCHANGE
POSTMASTER-GENERAL PAYNE'S ORDER AROUSES INDEPENDENTS
OHIO INDEPENDENTS TO MEET FEB. 17-19

The Operating Field:

THE CUYAHOGA'S NEW SWITCHBOARD
MEETING TO BE HELD OF KANSAS ASSOCIATION
TAMPA, FLORIDA, COMPANY ELECTS OFFICERS
MOSCOW'S NEW SYSTEM
AN ENGLISH ANTI HUM DEVICE

A TEST OF PUPIN'S SYSTEM
COMPANIES CONSOLIDATE IN NORTH MISSOURI
MICHIGAN COMPANIES CONSOLIDATE
COPY BURNT FOR P. & A'S NEW DIRECTORY
THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 64.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

A customer remarked upon going thru] our immense warehouse and shipping room that we apparently were not very busy.

Yet at that time we were experiencing one of the biggest rush weeks of the year; but due to the systematic and methodical manner in which orders big and little were being laid out and packed this man thought we were not busy. His idea that confusion and bustle were necessary is not uncommon, and is one of the regrettable features of many business houses. Confusion, disorder, commotion, flurry and excitement all mean mistakes, delays, breakage and losses.

None of this in our business. No money in it. Adds an easy 10% to cost of doing business. Adds a 5 or 10% on the customer before the year is done. Cut it out before it costs you. Catalogue upon request.

ELECTRIC APPLIANCE COMPANY, CHICAGO.

COOK PROTECTORS

STANDARD



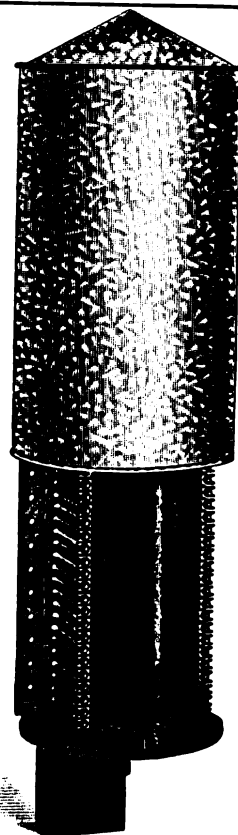
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.

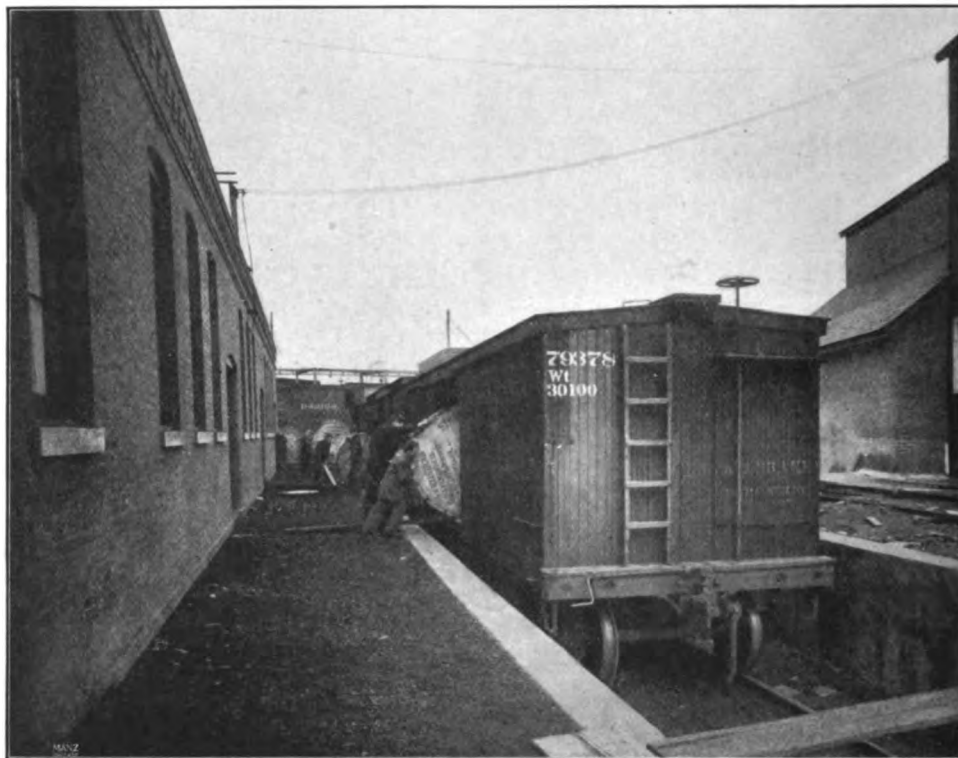


Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

Stromberg-Carlson Lead Covered Cable

is the same high grade as all their other products. For the benefit of those who are not familiar with our apparatus we can simply say

WE GUARANTEE SATISFACTION



SHIPPING FACILITIES AT OUR ROCHESTER FACTORIES.

Our facilities enable us to make cable to meet any specifications. When in need of such material let us know your requirements and we will gladly quote prices.

STROMBERG-CARLSON TEL. MFG. CO.

General & Eastern Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.

THE PENDENT TELEPHONE

W
R
I
T
E
U
S

A
S
K
F
O
R
I
T



COSTS NO MORE THAN
THE ORDINARY DESK
OR WALL PHONE

THE VOUGHT-BERGER COMPANY

Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN

Bridging Telephones

JUST THE THING FOR THOSE

RURAL LINES

Save Livery Hire and
Maintenance Expense

PAY DIVIDENDS

We also make

**A FULL LINE of
SWITCHBOARDS**

Get Catalog

The NORTH Electric Co.

CLEVELAND, OHIO

156-166 St. Clair St.

C. N.
159

No. 10

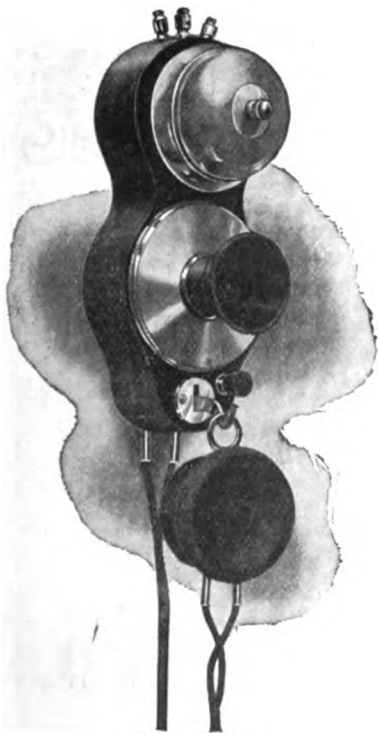
ORIGINATED
BY US

The best telephone
ever devised for pri-
vate lines, or for
school, hotel and resi-
dence systems.

WRITE US
FOR
BULLETINS

**S. H. COUCH
COMPANY**

162 PEARL ST.
Boston, Mass.

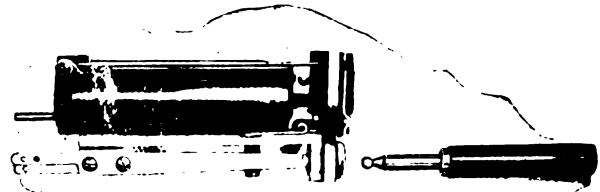


**NEW ENGLAND'S
LEADING TELEPHONE
MANUFACTURERS**

INTERNATIONAL Telephone Mfg. Co.

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity
and durability of parts, perfection of
mechanical detail and neatness of
design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**
CHICAGO, ILL.

Multiple Switchboards

**T
E
L
E
P
H
O
N
E
S**

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

**T
E
R
M
I
N
A
L
S**

PROTECTIVE DEVICES

Blaine Land Anchor

"You drive the rod through the ground"

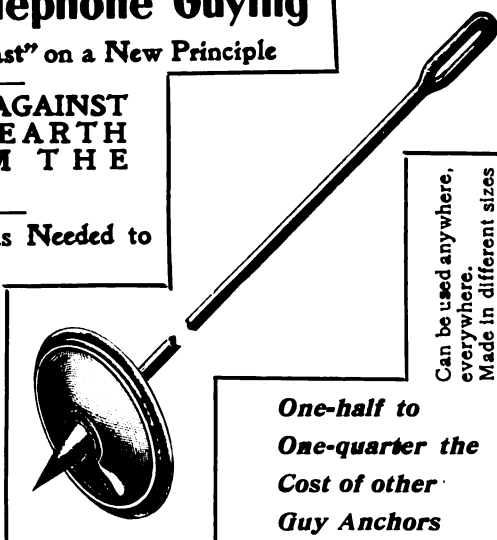
For Telephone Guying

"Hold Fast" on a New Principle

**PULLS AGAINST
SOLID EARTH
FROM THE
START**

**No Tools Needed to
Install it.**

**Cheap
Portable
Easy to
Install
Instantly
and
Eternally
Firm**



Can be used anywhere,
everywhere.
Made in different sizes

**One-half to
One-quarter the
Cost of other
Guy Anchors**

You dig the hole, drive the rod through the ground till the point enters the bottom of the hole, then you attach the Land Plate. See how simple?

Write for Descriptive Circulars, Prices and Full Information

—MANUFACTURED BY—

The Attica Foundry & Machine Co., Attica, Ohio

TELEPHONE SUPPLIES



Bulletin 233, showing Telephone Specialties is now ready and will be sent prepaid on request.

This Bulletin is now part of our big illustrated catalog.

THE F. BISSELL COMPANY.
TOLEDO, O.

RECENT New Apparatus of other manufacturers is conforming more and more to **KELLOGG STANDARD.**

Some manufacturers are entirely remodelling their telephone apparatus into what careful examination shows to be mere imitation of the **KELLOGG STANDARD APPARATUS.**

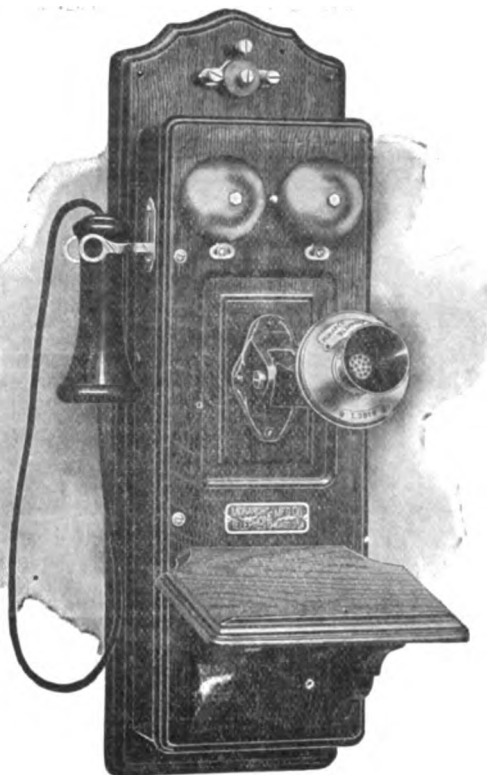
We are constantly improving and adding attractive features to our standard, but **FUNDAMENTAL CHANGES** in apparatus are only of those manufacturers whose product differs from Kellogg forms and Kellogg successes.

Examine for yourself!

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Green and Congress Streets, Chicago

346 BROADWAY, NEW YORK.
ELECTRIC BUILDING, CLEVELAND.
KEYSTONE TELEPHONE BUILDING, PHILADELPHIA.



MONARCH COMPACT TYPE TELEPHONES

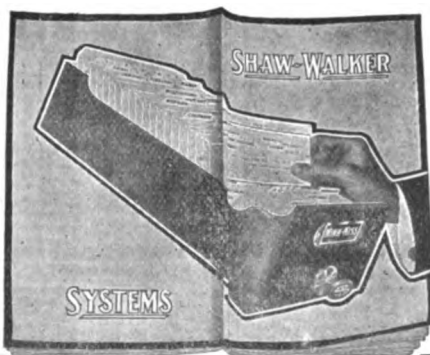
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

All the big Companies
use them!

ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

"READY" TELEPHONE MEMORANDUM PAD HOLDERS

Patent Pending

Can be furnished to fasten on telephone or on the wall as shown in illustration. Adjustable to any angle, each Holder has straight edge for tearing off memorandums.

NET PRICE EACH \$1.00

Style No. 1

MANUFACTURED BY

THE W. G. NAGEL ELECTRIC CO., Toledo, O.

ADVERTISERS' DIRECTORY

American Conduit Co. 37	Eccleston Lumber Co. 33	Klein, Mathias, & Sons. 33	Roebling's, John A., Sons Co. 11
American Electric Teleph. Co. 40	Electric Appliance Co. 3, 10	Leslie, A. C., & Co. —	Sand Point Cedar Co. 30
Am. School of Correspondence. —	Elkin Machine Co. 33	Lindsley Brothers Co. 30	Seoville Mfg. Co. 2
American Vitrifed Conduit Co. 39	Ericsson Telephone Co. 10	McIntire, C. Co. 36	Shaw-Walker Co. 8
Attica Foundry & Machine Co. 6	Fahnestock Transmitter Co. 33	Maltby Lumber Co. 29	Standard Underground Cable Co. —
Automatic Electric Co. 9	Field, C. J. 36	Michigan Cedar Co. 33	Stanton L. W. 34
Barr, W. J., Mfg. Co. 12	Fowler, John H. 32	Middleton, J. W., & Co. 34	Sterling, W. C., & Son. 33
Beidler, Francis & Co. 33	Franklin Mfg. Co. 34	Miller Anchor Co. —	Sterling Electric Co. 6
Bissell Co., The F. 6	Franklin Rolling Mill & Fdy. Co. 31	Monarch Telephone Mfg. Co. 8	Stromberg-Carlson Telephone Mfg. Co. —
Butterfield, J. F. 34	Gest, G. M. 38	Morse Cedar Co. 33	Swedish-American Tel. Co. 12
Camp, The H. B. Co. 39	Hemingray Glass Co. —	Nagel, W. G., Electric Co. 9	Telephone Printing Co. 33
Central Mfg. Co. —	Holtzer-Cabot Electric Co. —	National Wire Corporation. 11	Townsend Cedar & Supply Co. 32
Central Telephone & Electric Co. —	Huebel, C. J., & Co. 29	New Haven Novelty Machine Co. 2	Valentine Clark Co. 30
Chicago Writing Machine Co. —	Hyde, W. H., & Co. —	North Electric Co. 5	Vought-berger Co. 5
Cohn & Bock. 33	Imperial Finance & Cons. Co. 34	Nungesser Electric Battery Co. —	Wanted, Situations, etc. 64
Connecticut Teleph. & Electric Co. —	Ingram-Richardson Mfg. Co. 8	Okonite Company 34	Weston Electrical Instrument Co. 34
Cook, Frank B. 3	Index of the Technical Press. 30	Pacific Coast Pole Co. 30	Wisconsin Timber & Land Co. 33
Couch, S. H. Co. 5	Inland Steel Co. 32	Pignolet, L. M. 35	Worcester, C. H., Co. 29
Craghead Engineering Co. 12	International Telephone Mfg. Co. 5	Pittsburg & Lake Superior Iron Co. 29	Yesbera Mfg. Co. 12
Crumb, W. H. Co. 34	Kellogg Switchboard & Supply Co. 7, 32	Pittsburg Sewer Pipe & Conduit Co. 36	
Cunningham Iron Co. 36			
Dickey Clay Mfg. Co., W. S. 36			
ANCHORS.			
Attica Foundry & Machine Co., Attica, O.	Bissell Co., The F., Toledo, O.	CABLE SLEEVES.	Nagel, W. G., Electric Co., Toledo, O.
BATTERIES.	Kellogg Switchboard & Supply Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.
Electric Appliance Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	New Haven Novelty Machine Co., New Haven, Conn.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Mungesser Electric Battery Co., Cleveland, O.	National Wire Corporation, New Haven, Conn.	CARD INDEX SYSTEMS.	CONNECTORS.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Okonite Co., New York.	Shaw-Walker Co., Muskegon, Mich.	Cook, Frank B., Chicago, Ill.
BONDS.	Roebling's Sons Co., John A., Trenton, N. J.	CLIMBERS.	McIntire Co., C., Newark, N. J.
J. W. Middleton & Co., Chicago, Ill.	Standard Underground Cable Co., Pittsburg, Pa.	Klein & Sons, Mathias, Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.
BRASS.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	CONSTRUCTION SUPPLIES.
Seoville Mfg. Co., Chicago, Ill.	CABLE HANGERS.	CONDUITS.	American Electric Tel. Co., Chicago, Ill.
BOOTHES.	Bissell Co., The F., Toledo, O.	American Conduit Co., Chicago, Ill.	Attica Foundry & Machine Co., Attica, O.
Yesbera Mfg. Co., Toledo, O.	Cook, Frank B., Chicago, Ill.	American Vitrifed Conduit Co., New York.	Craghead Engineering Co., Cincinnati, O.
CABLES.	Craghead Engineering Co., Cincinnati, O.	Camp Co., The H. B., New York.	Electric Appliance Co., Chicago, Ill.
American Electric Tel. Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	Cunningham Iron Co., Boston, Mass.	Franklin Mfg. Co., Syracuse, N. Y.
	Standard Underground Cable Co., Pittsburg, Pa.	Field, C. J., New York.	
		Gest, G. M., Cincinnati, O.	

WANT AND FOR SALE ADVERTISEMENTS, PAGE 64.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



If you don't give your subscribers
AUTOMATIC TELEPHONE SERVICE you
don't give them the best.

Write for our catalogue.

Automatic Electric Company, Chicago, U. S. A.

Do You Want the Best ?



It's so much cheaper in the end than the inferior grade that is always in need of repairs.

The first cost of the Ericsson Telephone is practically the only cost. It's cheap to maintain, and always in prime condition.

We make *high grade, durable* telephones for magneto or common battery.

Write for illustrated booklet and laughter-provoking novelty.

Ericsson Telephone Co.

**Mfrs. of TELEPHONES and
TELEPHONE PARTS**

296 Broadway, New York, New York.

ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Mch. Co., New Haven, Conn.
Scoville Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Creaghead Engineering Co., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Attica Foundry & Machine Co., Attica, O.
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 36.

1900 Dry Batteries are "easy money"; once used, used again, once sold, stay sold, and that means easy money and that explains why the price is low.

The smaller the number "scrapped" on account of defects, the less the *factory cost*. The fewer complaints, the fewer to come back to be replaced, the less the *selling cost*. The better the battery, the guaranteed satisfactory service, the less effort, expense and cost of advertising to sell the next batch.

Easiest proposition to figure—the best battery and the best price—it's easier to figure after you try a barrel. The most satisfactory battery made and the lowest in price when figured (price x service=) comparatively with the cheapest battery ever offered.

ELECTRIC APPLIANCE COMPANY, CHICAGO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Insulated
Electrical
Wires and Cables

R DEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

Agencies and Branches

NEW YORK SAN FRANCISCO	CHICAGO PHILADELPHIA	CLEVELAND ATLANTA
---------------------------	-------------------------	----------------------

SUBSCRIPTION BLANK

Cut this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....

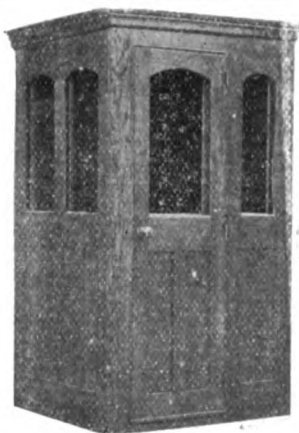


TURN OVER A NEW LEAF.



SWEDISH-AMERICAN

TELEPHONE COMPANY
CHICAGO



SOUND PROOF BOOTHS

are the only kind good for anything. *THEY* need Experience to make. That's why ours are sound proof and most others not. **AND OURS COST LESS**, because of our labor saving plant. Write and see catalogue.

YESBERA MFG. CO.,
TOLEDO, OHIO.

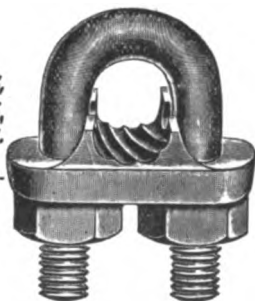
Line Hardware

POLE FITTINGS

CROSS ARMS, BRACES, BOLTS, LAGS, WASHERS, PINS, STEPS, MESSENGER HANGERS, GUY RODS.

and All Kinds of Telephone Line Construction Material.

SEND SPECIFICATIONS



The Creaghead Engineering Co.,
CINCINNATI, OHIO.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JANUARY 23, 1904

NUMBER 4

THE NEW CLARKSVILLE EXCHANGE



Exchange Building of the
Clarksville Home Tele-
phone Company.

ANOTHER southern city is to be congratulated on its having a new Independent telephone system, which will furnish better service at lower rates than those that have been in vogue. Of late the South has come forcibly to the front in the matter of telephoning its cities, and the present instance is but one of many cogent examples. In making a survey of the city, now described, it does not take an experienced telephonist to tell which of the two telephone systems installed in it will do the best for its patrons. It is an almost invariable rule that things that look right are right, and by merely taking a glance at the streets of the city of Clarksville one cannot help but make a comparison of the appearances of the outside constructions of

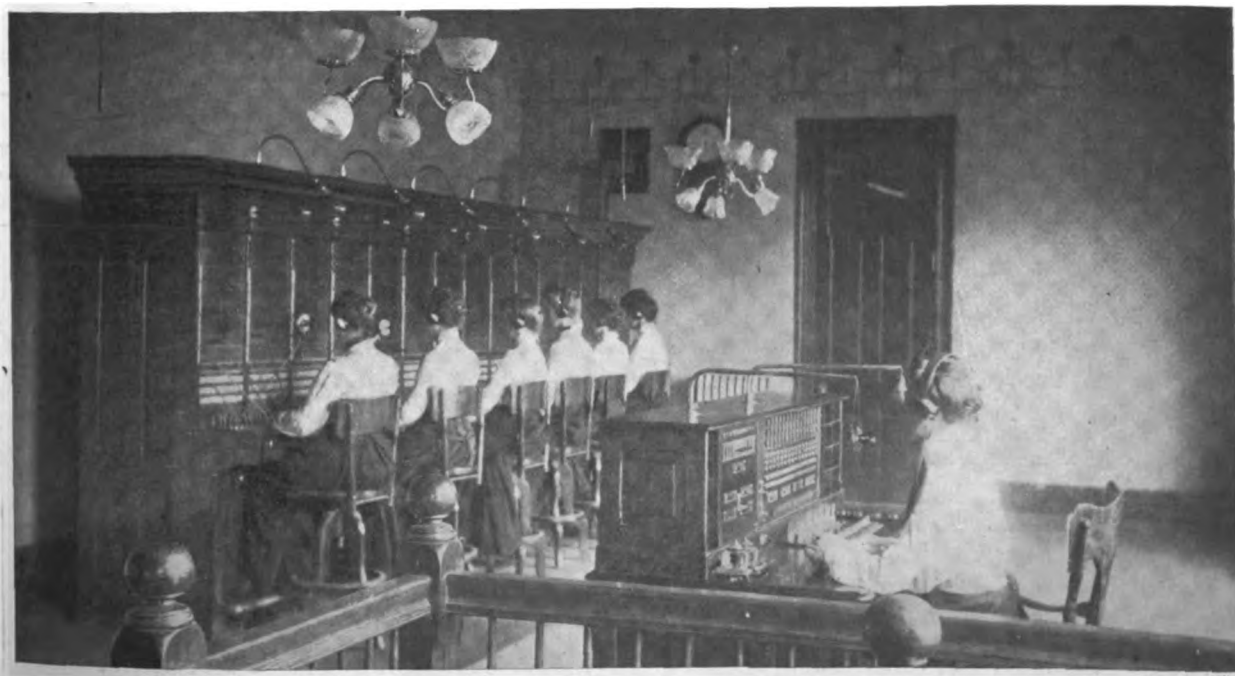
the local and the monopoly company. In the photographs that are shown, where there are leads of the two companies on either side of a street, the difference is impressively evident. As an example of Clarksville "Bell" construction, the cable entrance to the monopoly company's exchange, which we illustrate, is good. It does not take a telephone engineer to foretell that with construction like this service would be out of the question.

Tennessee Railway. The city, which is as a whole quite industrious and progressive, is acknowledged as the greatest dark tobacco market in the world. Its important industries are snuff and iron manufacture. Its tobacco warehouses are among the largest in the world, and it is also an important center for hardware, groceries, drugs and dry goods.

The Clarksville Home Telephone Company, which operates the Clarksville exchange, commenced operation in 1902, and has exchanges as follows: Clarksville, Tenn., 600 subscribers; Erin, Tenn., 175 subscribers; Cumberland, Stewart County, Tenn., 175 subscribers; Dover, Stewart County, Tenn., 50 subscribers; Lafayette, Ky., 50 subscribers; Guthrie, Ky., 175 subscribers. Besides these exchanges the company owns country lines which cover the counties of Montgomery, Houston, Stewart, Tenn. It operates long distance lines through these exchanges and counties which aggregate in length 90 miles. The company is consolidated with the Peoples' Telephone Company of Cumberland, Tenn., and with the Houston Telephone Company, of Erin, Tenn. There are upwards of 150 local stockholders, to whose interest and enthusiasm, together with the highest quality of service, is due the remarkable favor with which the company has been received. Its rates are quite equitable, the service the best and the subscribers' list is enlarging at a rate which pleases all interested.

The officers of the company are: H. C. Merritt, president; Dancey Fort, secretary; H. M. Perry, manager. All of these gentlemen are residents of Clarksville.

The system is full central energy, metallic circuit, there being installed at the present time 600 individual metallic circuits. The switchboard is equipped complete from the board to the dis-



Switchboard and Operating Room of the Clarksville Home Telephone Company.

Clarksville, Tenn., is a thriving city of about 15,000 population, located in Montgomery, Tenn., about thirteen miles from the Kentucky border, on the Memphis division of the Louisville & Nashville Railway, and on the Nashville division of the new

tributing rack, for 900 subscribers. Ultimately, the equipment will accommodate 3,000 lines. The company owns its own office and exchange building, a photograph of which is shown, which was designed and built especially for its individual needs. It is a

two-story brick building with ornamental pressed brick front and plate glass windows. The front portion of the first floor is fitted up for the manager's office, counting department and public pay stations.

Messenger service is provided in connection with the pay-station service for notifying parties that have not telephones when toll calls are made for them. The rear on first floor is fitted for offices of the company, the director's room, etc. On the second floor is the operating room and operators' recreation room, also drafting and record department. In the rear is installed the terminal appliances and power apparatus and wire chief's desk. The basement is used for a general storeroom for stock apparatus and line supplies.

The underground conduit system embraces the main business district. The multiple duct type of vitrified clay conduit, furnished by Standard Vitrified Conduit Company, of New York City, was utilized throughout, in accordance with standard specifications. The general plan followed was to locate the distributing poles in the center of each block, providing lateral conduits connecting with the main or branch conduit lines at manhole intersections. The distributing poles were equipped with Sterling boxes to enable the drops to be distributed in all directions. The conduit lines for reaching residence districts terminate in manholes and laterals provided for extending to the cable terminal poles. Iron pipe bends are used at the base of the poles cemented to the lateral ducts, and are extended up the poles practically to the base of the cable boxes, so as to protect the

Each pair of drop wires is fastened to the insulators, and connected to the bridle wires through five ampere tubular line fuses.

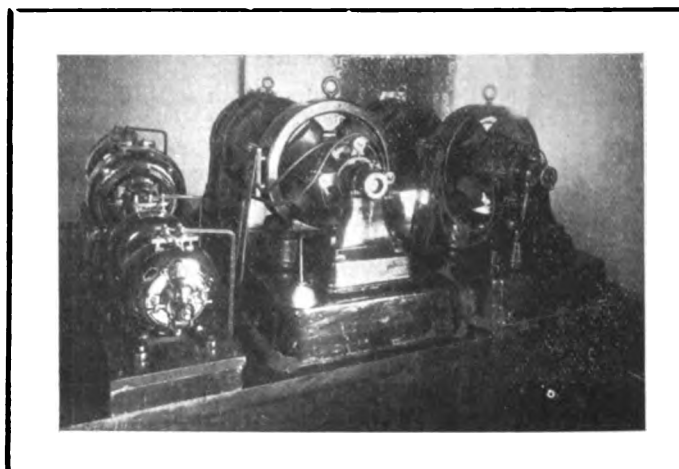
The underground cables were drawn into the conduit system, carefully spliced and laid up in the manholes. The cables at the office end are spliced to cables of wool wrapped insulation and leaded. Splices were made in the cable run in the basement as near below the main distributing frame on the first floor as convenient, and terminated on the cable clips, the lead sheath being removed sufficiently above the floor line to permit the conductors to be fanned out for terminating, and thoroughly shellacked. This method of splicing leaded switchboard cable to the underground cable avoided the necessity of making pot-heads at the central office and greatly facilitated connecting the cables on the main distributing frame.

The pole lines are pointed out with pride by the company, and erected with a view of being an ornament to the streets rather than be classified as obstructions. The routes were carefully selected and the utmost care exercised in the construction of the work. Pole leads are of 40, 50 and 60 foot painted poles,

60 foot poles are used for the cable and pole top distribution. Aerial cable was used extensively and No. 12 B. B. iron wires

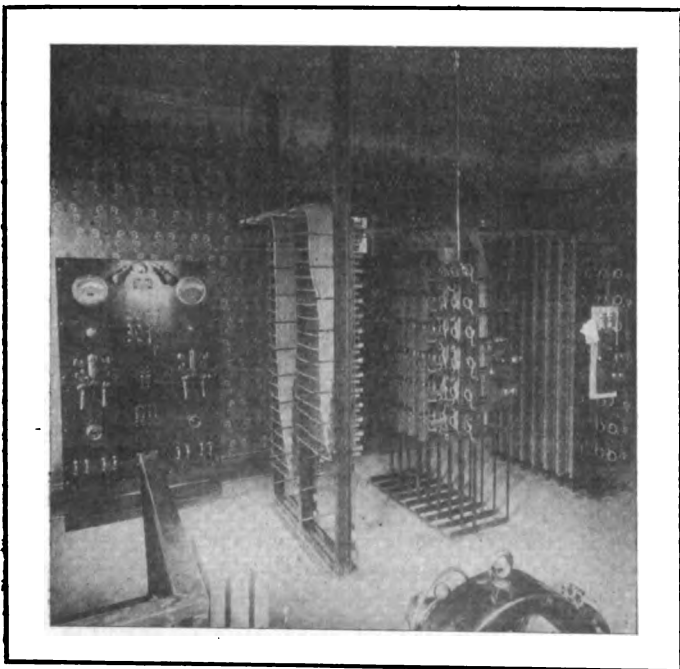


H. M. Perry, Manager Clarksville Exchange.



A View of the Battery Charging and Ringing Sets.

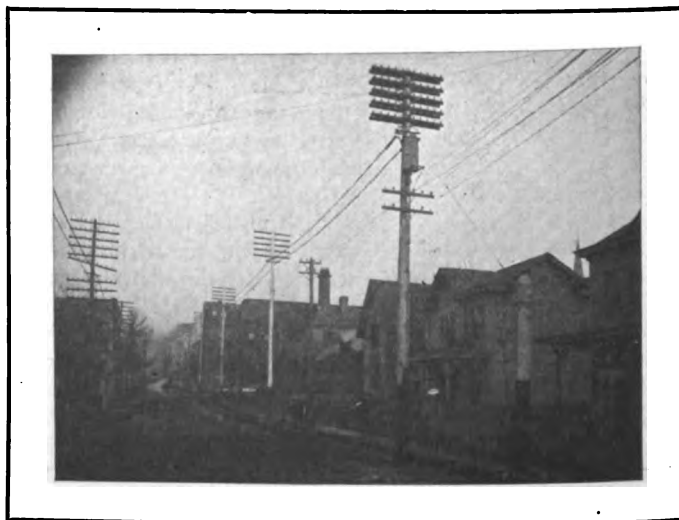
were used for the local distribution wires. The underground and pole line work was accomplished at considerable expense above that of average conditions, owing to the stony subsoil and



Power Board, Terminal and Relay Racks.

sheaths of the cables therein contained from being punctured by accident or design. The total capacity of underground cables installed is for 1,000 telephones.

The underground cables used are of the dry core type, double wrap, paired and provided with lead sheath. The main cables are of 200 pairs with smaller sized cables for branches. Where branches are taken off, Y splices are made on the main cables in the manholes. The cables on cable poles terminate in flexible pot heads with plain okonite twisted pairs soldered to terminal clips. Bridle wires, carefully insulated, are carried out to the pins.



A Bit of the Clarksville Line Construction.

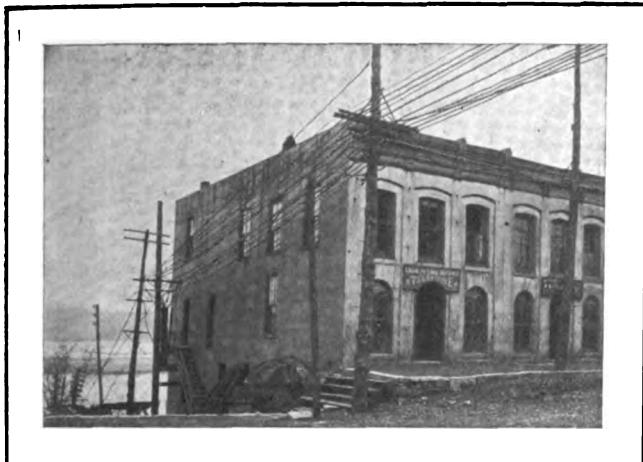
uneven contour of the ground, amounting to hills and steep inclines in the main part of the city.

The exchange equipment is full common battery multiple lamp

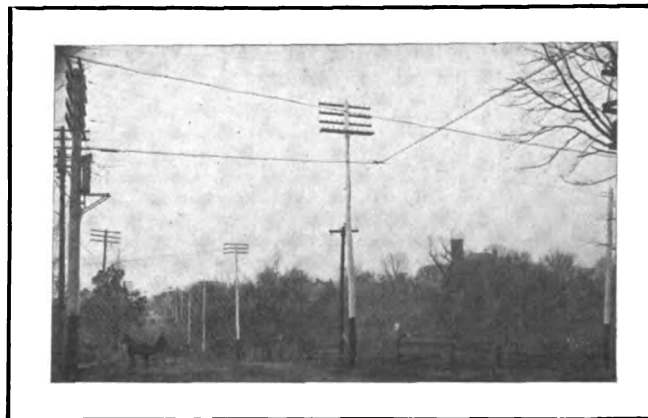
signal, having an ultimate capacity of 3,000 metallic lines and an installed capacity of 900 lines. The board consists of cable turning section, multiple annex and six regular operators' positions of 150 lines each, equipped in addition for a four party line selective signalling system. The auxiliary equipment, consisting of main distributing rack of an installed capacity of 900 lines, equipped with Sterling heat coil and carbon protectors, one intermediate distributing rack of 900 metallic lines capacity, the usual relay frames for the same capacity, a duplicate set of charging and ringing machines, all of Holtzer-Cabot make, one power

controlling the operation of the motors so that none of the apparatus or connections to anything but the storage battery and charging generators themselves is on the power board. The exchange has one two-position chief operator and toll desk equipped with all necessary apparatus for the chief operator's use, the toll position being equipped with the necessary automatic trunks to and from the main switchboard.

The construction of the plant was immediately under the control of D. O'Dell, superintendent for the Commercial Construction Company, to whose energy and ability is due the first-class



Some "Bell" Cable Construction in Clarksville.



Lead of Clarksville Home Company on Hame Avenue.

switchboard equipped with the usual switches and indicating apparatus. The indicating instruments are of Weston, and the switches of Crouse-Hinds manufacture.

Duplicate sets of storage battery are supplied, each of sufficient capacity to operate the exchange for twenty-four hours. The charging machines have three-phase motors direct coupled to generators, the ringing machines are, one driven by a three-phase current, the other driven by the storage battery. A starting box panel is also provided separate from the power switchboard for

construction which was put into this plant. The organization of the operating force was also under Mr. O'Dell, whose experience in the operating of telephone exchanges dates back many years. The Sterling Telephone Manufacturing Company furnished and installed the switchboard equipment, and the Stromberg-Carlson Telephone Manufacturing Company furnished all central energy telephones used in this plant. Cables, conduit, pole line material and other supplies were furnished by the W. G. Nagel Electric Company, Toledo, Ohio.

POSTMASTER-GENERAL PAYNE'S ORDER AROUSES INDEPENDENTS

INDEPENDENT telephone interests in Cleveland and the vicinity, are aroused to the highest pitch of indignation by the recent order of Postmaster-General Payne, which in effect, bars the telephone business of the postal department to the Independent companies and turns it over to the Bell monopoly. The matter has been brought to a crisis in Cleveland with the approach of the time when the Cuyahoga Co. must remove its telephones from the Cleveland post office. That time is Jan. 31.

Cleveland, as the center of Independent telephone activity in that locality, is being looked to as the point from which a determined stand is to be taken against the objectionable order. Already President Dickson of the Cuyahoga Co. has brought the matter to the attention of President Roosevelt, who has promised to make an investigation. Unless the order is countermanded very shortly, there is every prospect that it will become mixed with politics to no small extent. It is said that capitalists interested financially in the Cuyahoga Co., have asked for the aid of Senator Hanna in the fight for the Independents. What the Senator will do in the matter has not yet been stated.

The fight is being made principally from Cleveland for the Middle West. That the action of the Postmaster-General is, to say the least, exceedingly unfair to the Independent interests, is shown in the experience of the Cuyahoga Co. in Cleveland. Some weeks ago the order was received by Postmaster Dewstoe

that the Independent telephones were to be removed. It was not at once obeyed, for it was shown that such action would work considerable inconvenience. Another order has been received by Postmaster Dewstoe to cancel the contract at the end of the month in spite of the fact that President Dickson of the Cuyahoga Co. has signified his willingness to allow the instruments of his company to remain, President Dickson taking a chance of getting the edict from Washington countermanded. The government will hear nothing of such a plan. The Independents must go, whether they want to or not, and whether the telephones are paid for or allowed to remain in the post office building without a cent's charges so far as the company is concerned. Other cities in this locality have had similar experiences.

Since the Bell company has succeeded in keeping a monopoly of the business in the District of Columbia, the order of Postmaster-General Payne to the effect that no company is to be patronized which is without a long distance connection into Washington, is absolutely prohibitive so far as the Independent interests are concerned. Not only in Cleveland is wrath at the discrimination very great, but in all the field about Cleveland, where there are at present many Independent telephones in the post offices of towns and cities throughout northern Ohio and adjoining States.

Those interested in Independent telephone interests have great hopes that the influence of Senator Hanna, if it can be secured,

will bring about a reconsideration of the government's action. It is known that he is near to many of the men interested in the Cuyahoga Co., and other Independent lines, and it is conceded that there could be no stronger champion.

The attitude of President Dickson is shown in the following letter to President Roosevelt:

"The post office in Cleveland is supplied with ten telephones of the Cuyahoga Company. Each telephone has a pair of wires running direct to the exchange, so that over these wires the post office officials may talk directly with parties in Cleveland or throughout the State. For this service the government pays \$360 a year.

"The Bell Company has a private branch exchange in the post office with eleven telephones and two pairs of wires extending to the exchange. For this the Government pays \$324 a year.

"You will notice that the actual capacity of the Cuyahoga is five times that of the Bell. Five of the Independent telephones are located at the sub-stations of the post office. If these five are removed, and Bell telephones substituted, the cost of the government will be increased from \$36 to \$60 per telephone per annum. The Independent telephone connects with more than 4,000 subscribers who do not take the Bell telephone.

Dickson goes on to say: "Is this fair play? Does your administration propose to enter the lists to crush out the Independent telephone industry or to benefit the Bell monopoly? I do not believe that you will permit it.

"I could get a half a dozen members of the Senate, or House, to call upon you on this matter, but I do not believe it is necessary for me to use political influence to secure a hearing on a question which involves simple decency and fair play.

"You will notice that this order does not leave it to the discretion of the postmaster to retain the telephone which is of the most use to his business, but commands him in all cases to give preference to the Bell Co., as it is the only one in Washington.

"It does not seem to me possible that the postmaster-general was aware that through the Independent telephone the postmaster in Cleveland could communicate with 457 exchanges in the State of Ohio, with a total of 140,000 telephones, while over the Bell wires he could call upon only 101 exchanges with 90,000 telephones. Assuredly the postmaster-general did not know this nor could he have known that there are 356 cities and towns in the State which have no Bell exchanges, but must be reached over the wires of the Independent companies.

"I am trying to conduct this business in an honest and fair manner, and I propose to give the people using our telephones the best possible service for the least money. If we make money in doing this, I propose that our employees shall share in the profits they have helped to make.

"If our natural rivals 'the Bell Co.,' strive to interfere with these modest ambitions of mine, as they very properly may do, I will welcome them heartily to the arena; to beat them is merely a relaxation. I confess, however, that I do not wish to be compelled to fight the United States Government, also, at the same time; yet, if that is the wish of the powers at Washington, I will not complain. I know I can still win my fight, even against such odds as these, because I know that I will be in the right and that the postmaster-general will be in the wrong."

The announcement has been made that information has been forwarded to Washington charging that the postmaster-general was at one time an official of the Wisconsin Telephone Co., which is the Bell company of that State. More than two hundred

Independent companies of the Middle West have already joined in the fight and pressure is being brought to bear from every point of vantage.

In the meantime, President Dickson has not been idle. Already President Roosevelt has had a conference with Postmaster-General Payne relative to the order, and it is believed that the forceful letter that Mr. Dickson sent to the president, had a great deal to do with bringing this conference about. Mr. Dickson is a man of wide influence, and is busy lining up his friends should it be necessary to call them to his assistance.

A recent interview with the postmaster-general reported by the Washington correspondent of a Cleveland paper has inspired another letter from Mr. Dickson to President Roosevelt. In it he says:

"I notice an interview in a morning paper with the postmaster-general on this subject. In it the postmaster-general is reported to have said that 'the theory on which these telephones are installed is service to the Government. There is no other reason for the outlay.' This seems to imply that the only use for the telephone is to enable the clerks or officials in the department to talk to one another, and that the people who do business with the departments need have no communication with the offices, and that the people who write letters, and thus give the department its only excuse to exist, are not to be considered at all. Of course the postmaster-general did not mean this and did not think this, as you may ascertain by referring to his last annual report, wherein he advocates a larger use of the telephone as tending to facilitate the business of the department in its connection with the public. He is reported to have advocated the calling of a farmer, for instance, by the postmaster and informing him of the receipt of a letter and the reading of it over the telephone if the party so requested.

"Is it not a little singular that while making such a recommendation the postmaster-general was at the same time deliberately cutting the post office off from more than one-half the telephones in the United States, and more particularly all the farm line development in existence?

"All through the Middle West there are hundreds of farm line telephones, many of which are mutual companies, a few miles in length, built and operated by the farmers, and uniformly connected with the Independent exchanges in nearby towns. The Bell Co. has practically no development of this character at all. Its policy in the past has been to develop its business only in the larger cities and to confine its business there to the business portions of the community as giving it the largest profits for the least investments.

"There were 4,000 telephones in Cleveland as late as 1897. To-day, as a result of the competition of the Independent company, there are over 20,000 telephones in use. From the most reliable source I am informed that there are 2,073,000 Independent telephones in the United States, as against 1,543,000 in the Bell System."

Up to the time of writing it had not been learned in Cleveland what the probable action of the president would be—whether he would face the storm of protest that the postmaster-general's order has brought, or whether he would use his influence to have the order recalled. Although no word to that effect has been received at the Cleveland post office, the Independent officials in Cleveland are strong in the hope that their labors will bring results.

ELEMENTS OF THE TELEPHONE

By B. C. WILHELM.

ORIGINALLY the series bell was used on grounded circuits, not because it gave better results under these conditions than when operated on metallic lines but because at the time this instrument was brought out, metallic circuits had not yet come into use. The bridging bell was invented solely for the purpose of connecting more than one telephone to a line. It was found that the series bell, on account of the comparatively large amount of current necessary to operate it, did not work well when many more than two telephones were connected across a line, the reason of this condition being the fact that the ringing current necessarily splitting up in equal amounts to pass through each bell, that flowing through each one was insufficient to ring with proper

loudness if at all. To overcome this defect a bell was devised, which possessed a much higher resistance, and therefore required less current to ring it.

The magnetizing effect of a current is measured by the current density in amperes, multiplied by the number of turns or convolutions of the wire over which it passes. For example, if the magnetizing effect of current of 1 ampere flowing through a single loop being represented by 1, that of the same current flowing through a circuit having 10 loops would be represented by $1 \times 10 = 10$. In other words the magnetizing effect in the second case would be ten times as great as that in the first case. Suppose that the magnetizing effect in the first case is sufficient to ring a

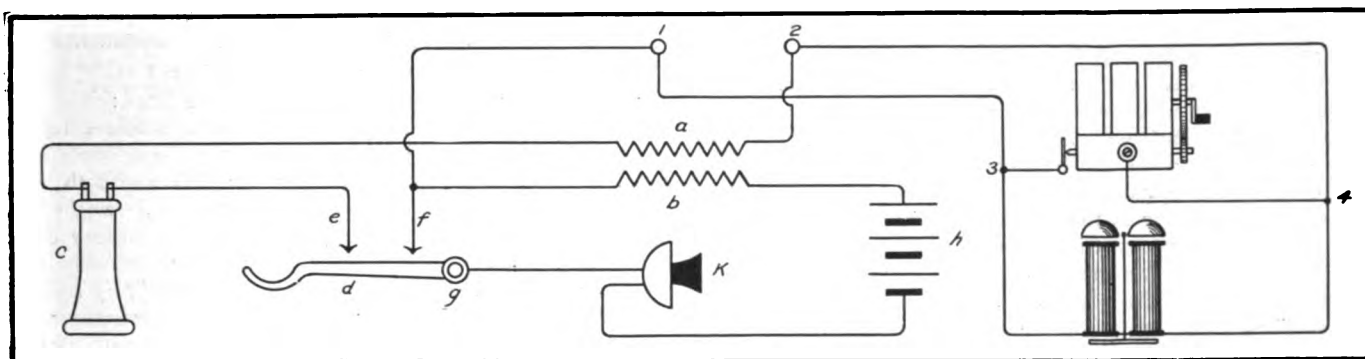
certain bell, then since the magnetizing effect in the second case is ten times as great, it would be necessary to have only $1/10$ of the original current, in order that the bell might ring properly. So that if the number of turns of wire on the bell magnet be increased by ten, the necessary current to ring the bell is decreased by 10.

Since, under these conditions, less current is required to ring any one bell, more is available to ring other bells, and therefore more bells may be connected to the line, and yet have each one ring satisfactorily. It was on this principle that the bridging bell was constructed. The bell coils were made longer, and the wire was wound upon them in a much greater number of turns than was the case with the series bell. The series bell had coils wound to a resistance of 80 ohms, while those of the bridging bell measured 1,000 ohms. That is to say, that the resistance of the bell coils of the bridging bell was $12\frac{1}{2}$ as great as that of the series bell coils and roughly, therefore, about $1/12$ of the former current was required for ringing.

The fact that the bridging bell coils possessed a higher resistance, and a greater number of turns than those of the series

while that on the bridging generator acts to connect the armature coil to the line when the crank is turned. When idle the series generator armature coil is connected to the line and short circuited, while that of the bridging generator is cut off from the line.

In the figure is shown the plan of wiring a telephone equipped with a bridging bell. Here the line is connected to the two binding posts 1 and 2. From 2 the circuit passes through the secondary winding *a* of the induction coil, and the receiver *c*. The other terminal of the receiver is connected to the contact *e*, while the other contact *f* is wired to the binding post 1. It will be seen that the hook switch is not equipped with a lower contact, as in the case of the series bell. The transmitter circuit includes the primary winding *b* of the induction coil, the battery *h* and the transmitter *k*, the other terminal of the circuit being permanently connected to the hook switch at *g*. The bell *j* is permanently bridged across the line at the binding posts 1 and 2, while the generator is bridged at the points 3 and 4. To sum up, the method of wiring the transmitter and receiver circuits is the same as that employed in connection with the series bell, the lower contact is removed from the



bell, made it possible to further change the method of wiring and therefore the construction of the telephone instrument. In the case of the series bell, the bell coils are automatically cut out of circuit by the action of the hook switch during conversation. This is done because otherwise some of the talking current would flow through them, with the result that the amount flowing through the telephone receiver would be diminished, and, therefore, the transmission impaired.

Since the resistance of the bridging bell coils is $12\frac{1}{2}$ times as great as that of the other type, the amount of talking current passing through them is very greatly decreased, so that the transmission is not seriously impaired by permanently connecting these coils to the circuit. Then, again, another property of the bell coils that must be considered is their impedance. Impedance is the name given to the resistance a conductor offers to the flow of alternating currents and the impedance of a bell coil is very nearly proportional to the square of the number of turns around it. To illustrate, if a certain bell coil had an impedance of 4 ohms, and the number of turns on it were doubled, instead of the impedance being twice as great, as one might expect, it would be four times as great, as the square of two is four ($2^2 = 4$). Therefore the impedance in the second case would be $4 \times 4 = 16$ ohms. Thus it is evident that the impedance that a bell coil of many turns would offer to the voice currents (which are alternating currents of very high frequency) would be very great and the amount of voice current shunted through them would be very small indeed. As a result the bottom contact on the hook switch, to which is connected one terminal of the series bell circuit, may be dispensed with, thus simplifying the construction of the instrument.

For convenience the generator is permanently bridged across the line, but since its armature coil forms a second by-pass for the current, it is automatically cut off from the line when not in use. The difference between this automatic switch and that used in connection with the series bell lies in the fact that the automatic switch on the series generator acts to open the short circuit around the armature coil when the crank is turned,

hook switch, and the bell and generator are permanently bridged across the line.

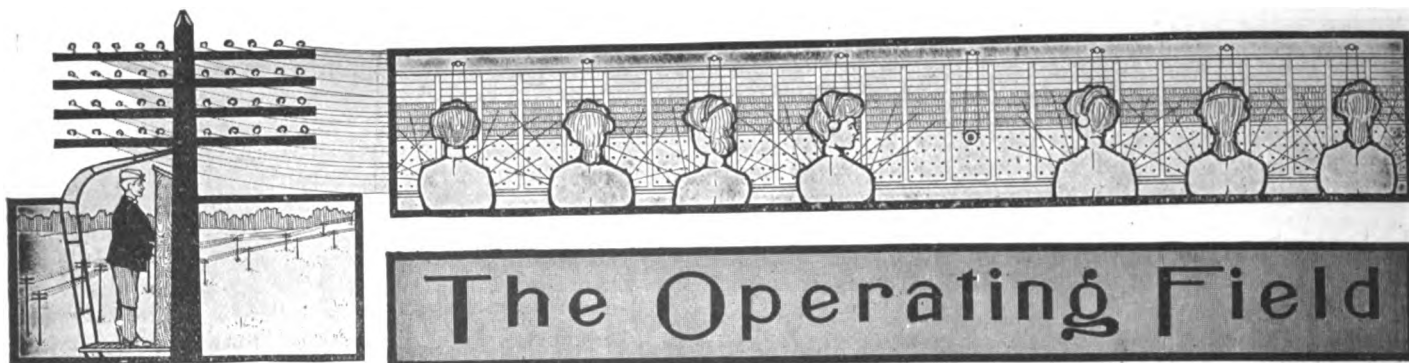
Whatever may be the details of the structure and wiring of a telephone, it can be always resolved into the outlines already shown, for either a series or bridging bell. The information already given is sufficient to enable the instrument setter to comprehend the nature of the makeup and operation of a telephone. The details of the structure, and the methods of setting up the batteries will be treated in detail later.

CLAIMS VESTED RIGHT TO LOCATION OF LINE.

AT Taunton, Mass., trouble over the location of poles and wires has arisen between the city and the Massachusetts Telephone and Telegraph Company, which is just entering the city. The company has secured an injunction restraining the city's superintendent of wires and board of aldermen from interfering with the lines of the company now in operation. The company contends that it has vested rights and locations acquired by purchase from the Western Union Telegraph company and by them from the Baltimore and Ohio Telegraph company. The city has revoked permission previously granted to the company to operate and maintain a telephone exchange in the city.

OHIO INDEPENDENTS TO MEET FEB. 17-19.

THERE will be a meeting of the Ohio Independent Telephone Association held in Cincinnati, O., Wednesday, Thursday and Friday, February 17-18-19, 1904. This meeting is called at the request of a number of the members of the association, and will be held in the Grand Hotel. Very reasonable hotel rates have been secured, and the railroads will offer special rates. Kentucky and Indiana Independent telephone companies have been invited, and the meeting will be largely attended. Cincinnati is the last city of importance in Ohio that has no Independent connections, and it is intended to show the citizens how the Independents do business.



CONVENTION OF WISCONSIN TELEPHONE COMPANIES.

THE annual convention of the Independent Telephone Companies of Wisconsin will be held at Milwaukee on the 10th and 11th of February. The Wisconsin Association is one of the strongest of the State organizations and its meetings have always been a success. The question of an Independent exchange in Milwaukee will be taken up and plans formed for carrying out this undertaking. Other matters of great importance to Wisconsin companies will be discussed and an effort made to secure the co-operation of all the companies in dealing with these problems. Some of the prominent telephone men of neighboring States will take part in the programme. The more important telephone manufacturing and supply houses have arranged to make displays of their apparatus. The convention headquarters will be at the Pfister Hotel, and the sessions will be held in the hotel convention hall.

THE CUYAHOGA'S NEW SWITCHBOARD.

AFTER a series of delays that have forced a postponement in the time of giving its new service, the material for the new switchboard of the Cuyahoga telephone Co., in Cleveland, Ohio, is now all on hand and the work of installation is being rushed to completion as rapidly as possible. It had been planned to have the board installed and to begin the new service by the first of the year, but now it will probably be sometime in March before all is in readiness for the change. The board is strictly modern. President Dickson says that he feels sure that, once in working order, it will give a service that can be surpassed nowhere in the country.

The installation of the new board will make it possible for the company to make several radical changes which it has admitted were greatly to be desired. In the first place, it will be possible to give a measured service where before there was nothing possible except the main line and unlimited service. Two and four party lines may be put in. It is the intention of the company to use the selective system exclusively for its party lines.

At a recent food show held in Cleveland, the Cuyahoga Co. had a very neat exhibit and issued a folder to the visitors showing what it expected to do in the way of bettering its service this year. The folder contained a popular description of some of the new equipment, with instructions as to the methods of operating the new instruments. The new switchboard will accommodate 18,000 lines and many more connections than that will be possible.

Within the past week the United States Telephone company has begun work on its extra wires to Toledo and the west. The work of extension eastward will be taken up as soon as possible and it is planned to have a through connection between New York and Chicago at a not remote date. It is said that the United States people have their eyes turned to the south, and that considerable work is to be done in the Cincinnati field. The United States company has a line into Cincinnati now, and it

is said to be the plan greatly to strengthen its position in that locality. In the meantime, the neighboring towns and cities will be given attention, looking to the time when Cincinnati is an important center for the company.

MEETING TO BE HELD OF KANSAS ASSOCIATION.

THE secretary of the association has issued the following notification to the Independents of the State: The third annual convention of the Kansas Independent Telephone Association will be held in the parlors of the Hotel Throop, Topeka, on Thursday and Friday, January 28th and 29th, next. Arrangements are being provided for what is now certain to be the largest and most interesting meeting in the history of the association. We have assurance of the attendance, not only of the larger manufacturers and dealers (who will have very complete exhibits of their latest and best), but of many prominent telephone men from without the State, who want to meet with the association that "does things." In addition to the several matters of real business importance which demand our attention, the social and entertainment features will not be neglected.

No man who is interested in legitimate Independent telephone interests in Kansas can afford to remain away from this meeting. The association is what we make it. Its power for our good is only limited by the support that we give it. A selfish, narrow, "every man for himself and the devil take the hindmost" policy on the part of the Independent companies in any territory will not only result in foolish, useless and wasteful competition, but in the lowering of the financial standing of the entire interest. Furthermore, the offensive or defensive strength of a single Independent company may not always be sufficient for the need of the hour. The combined influence of the Independent companies of Kansas is stronger. Let us be wise. It is your duty, not only to be there yourself, but to bring your neighbor.

TAMPA, FLORIDA, COMPANY ELECTS OFFICERS.

AT the regular meeting of the stockholders of the Peninsular Telephone Company, of Tampa, Florida, held recently, the following officers were chosen for the year 1904:

President, W. G. Brorein, Tampa, Fla.

Vice-President, Guy Huffman, St. Marys, Ohio.

Secretary, H. W. House, Wapakoneta, Ohio.

Treasurer, Guy Huffman, St. Marys, Ohio.

General Counsel, J. J. Lunsford, Tampa, Fla.

Board of Directors—W. G. Brorein, Tampa, Fla.; Guy Huffman, St. Marys, O.; J. H. Goeke, Wapakoneta, O.; Geo. K. Detwiler, Toledo, O.; J. J. Lunsford, Tampa, Fla.; H. W. House, Wapakoneta, O.; W. U. Lathrop, Bradentown, Fla.

It was determined by the stockholders that the business of the company and the extension of its properties has so greatly increased that Mr. Brorein, who had heretofore been in sole management of the company's affairs, should have an assistant, and Mr. Huffman, who is an experienced telephone man and large stockholder of the company, was selected as business manager to assist the president, Mr. Brorein, in the management of the

company's business and will have immediate charge of the operations of the company's properties.

Mr. Brorain, whose duties have lately been entirely too much for one man, will continue to live in Tampa, and remain in the active conduct and supervision of the company's affairs, which will continue to receive his personal attention, except that being relieved of much of the detail, he will have more time to look after the company's general interests.

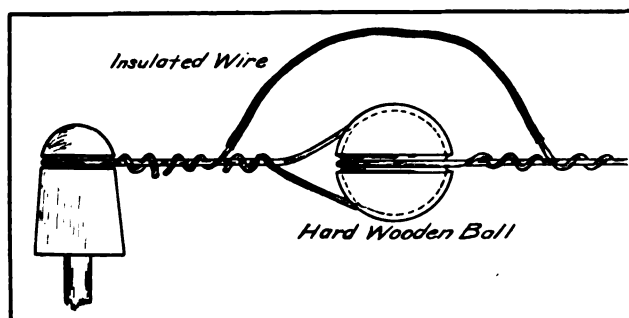
MOSCOW'S NEW SYSTEM.

THE new telephone station which is being erected at Moscow, will be one of the most complete in Russia. The building has five stories with a large basement. The main telephone room is situated in the fifth story. It contains switchboard accommodations for 22,500 subscribers. The fourth story is laid out for accumulators and dynamos, while the third story is taken up with the cloak-rooms for the employees. The second floor contains dining rooms, library, reading rooms, etc. The offices are situated in the second and first floors, while the basement serves for the storehouses, workshops and boiler rooms. The building is steam heated throughout. The construction of the new telephone exchange cost more than \$100,000. The new equipment will be central energy.

AN ENGLISH ANTI HUM DEVICE.

THE method here described of preventing the vibration in telephone wires from being communicated to a building to which they are attached is said to be in quite extensive use in England. We quote the description from the *London Electrical Engineer*:

"In the fixing of wires to buildings trouble is sometimes experienced through the humming noise, and several more or less



effective methods of overcoming the difficulty exist. One plan is to bind in the line wires with strips of lead about 1/2 inch wide, and twist the lead round the wires for a distance of about 12 inches from the insulator. A better and more excellent method is to break the wires about 18 inches from the insulators, as shown in the figure, and insert hard wooden balls doubly grooved for making off and terminating the wires, the continuity of the wires being made by bridging over the wooden balls with a piece of insulated wire.

MEETING OF SOUTHERN IOWA AND NORTHERN MISSOURI TELEPHONE ASSOCIATION.

A MEETING of the Southern Iowa and Northern Missouri Telephone Association was held in the Pool Hotel at Lancaster, Mo., recently. John M. Jaynes, of Memphis, the president, being absent, the vice-president, J. M. Kennedy, of Kirksville, presided, and after calling the meeting to order a number of important questions were discussed.

The following resolutions were unanimously adopted:

Resolved, First, that it is the sense of the twenty-two exchanges composing the North Missouri and Southern Iowa Telephone Association, that a Standard No. 10 copper metallic long distance toll line be constructed, starting from a point near Moberly, running through Macon, Kirksville and Lancaster, to some point in Iowa, to connect with a similar line running north to Des Moines, and from Lancaster east through Downing, Memphis, Kahoka and Keokuk, and that a company be organized with a capital stock of \$100,000, and a bond issue of \$100,000 be floated.

The following committee was appointed to organize the company: J. M. Kennedy, of Kirksville, chairman; Theo. Gary, Macon; J. B. Gooding, La Plata; Winfred Melvin, Lancaster; W. J. Steckel, Bloomfield, Ia.; J. M. Jaynes, Memphis.

TELEPHONE MEETING IN WEBSTER CITY.

A MEETING of the representatives of the various Independent and rural telephone lines of Hamilton County, Iowa, was held in Webster City recently, that will have a material effect on the telephone situation there in the future. The meeting was held for the purpose of perfecting plans for the merging of all lines into a sort of allegiance whereby an agreement will be made permitting the patrons of each to use the lines of the other without extra charge. The merger of the lines as planned is necessary to the carrying out of the plans of the Stratford Independent Company's franchise.

The companies represented at the meeting were:

The Stratford Independent Company.

The Stanhope Company.

The Ellsworth Company.

The Kamrar Company.

The Jewell Company.

The Webster City wing of the Stratford Independent Company.

D. C. Chase was elected chairman of the meeting and Walter Wilson secretary. Mr. Chase in explaining the plan of the merger said that it was the intention to combine all the Independent companies in the county into one company, not particularly a stock company, but for the purpose of getting free connection with one another and to have a mutual understanding.

SOUTHERN MICHIGAN INDEPENDENTS WILL ORGANIZE.

THE rural telephone companies of Jonesville, Mich., and adjoining towns in Hillsdale County, are making arrangements to form a Southern Michigan Telephone Association. The Jonesville company was organized eighteen months ago and now every highway leading from that town has its line and 98 per cent of the farmers along the roads are subscribers. All the adjoining towns are built out similarly, except Hillsdale. Three miles of line will connect the rural companies with Allen, Reading and Camden. This stretch will be built as soon as the material arrives. At Reading the rural can get connection over the United States Telephone Company's lines, and reach the States of Indiana, Illinois, Ohio, Kentucky, Pennsylvania, West Virginia, and Missouri.

COMPANIES CONSOLIDATE IN NORTH MISSOURI.

THE AMERICAN TELEPHONE JOURNAL of October 24, 1903, made mention of the Farmers' Telephone Association, of Missouri, holding a meeting for the purpose of deciding whether or not they should consolidate with the Citizens' Telephone Company, of North Missouri. Recently these companies met at Monticello, Mo., the county seat of Lewis County, for the purpose of consolidation. The following officers were elected: J. H. Blackburn, La Grange, president; J. R. Burgess, Williamstown, vice-president; P. N. Hanna, Canton, secretary and treasurer; C. O. Raine, general manager. The following are some of the directors elected: J. H. Blackburn, J. F. Gnuse, B. S. Bozarth, and E. F. Westhoff.

They will build exchanges in the largest cities in the county; also in the cities in the neighboring counties and in Keokuk, Iowa. The capital stock is \$12,000. The name is The Citizens' Telephone Company of North Missouri.

MICHIGAN COMPANIES CONSOLIDATE.

THE recent combination of the Oceana Telephone Company with the Pere Marquette Telephone Company, of Ludington, forms one of the strongest Independent combines in Michigan. The Oceana Company has about 700 subscribers, the Pere Marquette over 500. The former company was organized in 1899 and is capitalized at \$20,000, with no bonds, while the Pere Marquette also has \$20,000 capital, with no bonded indebtedness. It was established in 1901.



ONE MORE TYPE OF BELL MISREPRESENTATION.

THE favorite cry of the Bell telephone people in their frantic efforts to frighten off competition and maintain their monopoly is that the Independent telephone companies in their business management do not allow for the natural depreciation of the equipment in the course of years. They cannot deny the immense strides made in the direction of Independent telephony, a pace which has left the Bell companies behind, although backed by all the wealth of the Bell interests, accumulated through years of unholy monopoly. It is sometimes admitted that the Independent companies give good service at the start, and they have even gone so far as to admit that certain Independent companies are not making due allowance for wear and tear on the equipment and its natural depreciation. These earnings are not real, only apparent.

"But wait," they say. "The equipment of these companies is still new and, of course, gives good service. Wait a few years; the service will depreciate; the apparent earnings will become a deficit and the companies will become bankrupt. The Independent companies are not making due allowance for wear and tear on the equipment and its natural depreciation. These earnings are not real, only apparent."

This would be important if true, but the statement happens to be very far from the truth, as every one knows who has had any acquaintance with Independent telephone properties and their management. A certain wise old sinner used to say that the truth should not be spoken at all times, "even in jest." There is, perhaps, a modicum of philosophy in this somewhat questionable proposition. But the Bell people go much farther and exhibit an utter disregard for truth in a manner that is appalling.

It is impossible, of course, to follow up and deny all of the falsehoods which emanate from the Bell press bureau, although the AMERICAN TELEPHONE JOURNAL has been able to puncture a few of them. In spite of every effort the effect of plausible lies spread broadcast over the country cannot be entirely overcome. One of the most effective of these misrepresentations is this one mentioned to the effect that the Independents do not allow for the natural depreciation of their property. It so happens that all telephone companies have not been established on a sound financial basis. The telephone field has been an alluring one to a number of shortlived companies who have built simply in order to sell. Whenever one of these fake companies does sell, the Bell people send out their insidious press notices, citing the fact of the sale as unmistakable evidence that the Independent companies do not allow for depreciation. This has happened time and time again, and probably will happen again.

Yet, in view of recent events in Michigan telephone circles, it seems about time that these misleading and false statements should cease. The Michigan Telephone Company, a well known Bell concern, was wiped out of existence, sold to the highest bidder, with its apparatus and outside construction work in a most deplorable condition, but the Bell press bureau has not been heralding this fact far and wide to any alarming extent. The condition of the property showed well enough that the Michigan Company failed to make allowance for depreciation, or at least failed to keep the property up to a proper standard.

As a matter of fact, the Michigan Telephone Company was put out of business because the Independent operators did make

THE LESSON THAT IT TEACHES.

due allowance for depreciation and maintained their properties at a high standard of excellence.

The general public is not interested in the financial condition of a telephone company, except in so far as that condition affects the service rendered. What the public demands from a telephone company is good service. The fact that the people of Michigan preferred to use the Independent lines instead of the Bell shows well enough from which they received the best service. Certainly good service cannot be maintained with faulty construction. The fact that the Bell property was in a most deplorable condition at the time of the sale speaks volumes. In this connection, the comment of the Jackson, Michigan, *Morning Patriot*, an entirely disinterested spectator, will be of interest. This paper said editorially after the sale:

The foreclosure sale of the Michigan Telephone Company, an appanage of the Bell system, brings about the end of a corporation that has been handicapped so heavily by its relation to the American Telegraph and Telephone Company—the parent of the companies that have been known and advertised as the "Bell system."

Except with Independent companies, Michigan's experience has not been encouraging. The Bell methods have been exceedingly profitable for the parent company, but not for the corporations organized to construct and operate lines, nor advantageous to the public.

While but little has been generally known about the unfortunate Michigan company—publicity of its affairs having been avoided—it is easy enough to perceive, from what is known, that it was too heavily burdened, as one of the offshoots of a gigantic monopoly, to be a financial success. Its poor service and unpopularity seem to have been the outcome of the restrictions and disadvantages it labored under because of its relations to the parent concern.

The position of the Independent companies in the State is assured. They have proven their right to exist. Six of them—of which the Citizens of Grand Rapids is by far the largest—are paying regular and satisfactory dividends, quarterly, to their stockholders, who are largely inhabitants of our State, are under the management of business men who are unwilling to be cheated themselves or to cheat their neighbors, and who are not speculative promoters.

This shows what an honest, straightforward, business-like competition can accomplish. The Independent telephone companies of Michigan went before the people and asked for their patronage on the ground of superior service and the people were not slow to respond. No corporation of whatever magnitude can long endure when the people withhold their patronage. There are several lessons in this for the Independent companies, and one of these is that what the people of Michigan, withholding their patronage, did to the Michigan Telephone Company, the Independent operators of the country can do to that Bell concern, known as the Kellogg Switchboard and Supply Company. It is now pretty generally understood that the Kellogg Company is owned body and soul by the Bell people. It is a Bell concern masquerading as an Independent, a wolf in sheep's clothing, and as such deserves the condemnation of all who are engaged or interested in Independent telephony. If the Independent operators, who are in this case the consumers, act as did the people of Michigan, withhold their patronage, no power on earth can save the Kellogg Company. It will go the way of the Michigan Telephone Company and various other Bell concerns that have been wrecked through greed and mismanagement.

WIND PRESSURE TO WHICH AERIAL LINES ARE SUBJECTED

By FRANCIS W. JONES.

ONE of the first essentials in the construction of an aerial line is a consideration of the effect upon the poles and wires of the wind to which the line may be exposed. Experience has shown in the past that wind storms are one of the most prolific destroying causes to which telephone lines are subjected. In the past there has been much disagreement as to the pressure which wind storms exert. Partly this is due to the experimental data, and partly to the fact that wind pressure

72 inches, and area of section of cylinder 33 inches by 4 inches = 132 inches and 35 inches by 4 inches = 140 inches, former giving $\frac{2}{3.67}$ and latter $\frac{2}{3.89}$ or .545 and .515. In India two-thirds of the diameter multiplied by length is used to calculate the wind pressure area of poles and wires. Table II. is calculated on this basis:

Kernot, of Melbourne, demonstrated by experiment with heavy air blasts that the pressure at right angles on a cylinder was

TABLE I.—WIND PRESSURES.

Wind Velocity. Miles per hour.	U. S. Weather Bureau. Lbs. per square foot.	British Table. Lbs. per square foot.	Prof. Langley's. Lbs. per square foot.
20	1.27	1.97	1.42
30	2.64	4.42	4.21
40	4.44	7.87	5.71
50	6.66	12.3	8.92
60	9.22	17.7	12.85
70	12.2	24.1	17.50
80	15.5	31.4	22.85
90	19.2	40.	28.92

varies very greatly in different latitudes and under different circumstances. Professor Langley, one of the foremost authorities on dynamics, gives the following formula for wind pressure applying at various points:

R , resistance in pounds = $K A V^2$.

K , constant found by experiment = 0.00166.

A = area in square feet of one side of the plane.

V = velocity in feet per second.

Professor Langley also states that the resistance offered by a cylinder to wind is equal to one-half the resistance which would be encountered by a plane surface exposing an area equal to the longitudinal section of the cylinder. But as a matter of experience it is found that small cylinders such as wires, cords, ropes, etc., experience a resistance from five to ten times greater than would be calculated by Langley's formula. Probably it is due to the eddies and cross currents which such small bodies

TABLE II.—WIND SURFACE OF 1 MILE OF WIRE.

B. W. Gauge No.	Diameter, inch.	Diameter in feet.	Gauge No.	Diameter, inch.	Diameter in feet.
4	.238	69.8	7½	.138	40.5
6	.203	59.5	9	.114	33.4
8	.165	48.4	10	.102	29.9
9	.148	43.4	12	.08	23.8

set up in moving currents and air. The chief engineer of the British Telegraph estimates that telegraph lines may be calculated to withstand a pressure of 17 pounds per square foot for all surface which is exposed, and in the construction of poles and similar structures allows two-thirds of the diameter into the length as the equivalent area upon which the wind impinges. For 60 miles an hour British statistics give 17 pounds per square foot, whereas in Table I., published by the United States Weather Bureau, the velocity corresponding to 17 pounds is given at 85 miles an hour:

The Indian Bureau of Telegraphs in Calcutta, gives experiments made by swinging a plate 12 inches by 6 inches and a cylinder 4 inches in diameter, both of equal weight, and lengthening the extensible cylinder until both plate and cylinder attained the same amplitude of swing, giving the length of cylinder equivalent to the plate between 33 and 35 inches. Area of one side of plate.

TABLE III.—WIND SURFACE OF POLES.

Length above ground, feet.	Mean circumfer- ence, inches.	Area of 2/3 of diam- eter, feet.	Mean circumfer- ence, inches.	Area of 2/3 of diam- eter, feet.
20	27	9.54	30	10.59
30	30	15.91	34	18.01
40	35	24.73	38	26.86
48	38	32.24	41	34.79
58	42	43.06	45	46.15

about one-half on a flat surface of equal diameter, and that the pressure on one side of a cube was only .9 of that of a thin plate of equal area. Telegraph structures and wires must be designed not only to withstand the maximum ordinary wind pressures to which they may be subject, but also to resist sudden gusts which are far more destructive than a steady high wind velocity. The extra weight and wind surface of sleet and snows clinging to poles, arms and wires, and the areas offered by pins and cross arms to the wind must not be overlooked.

In estimating the effect of wind it must not be forgotten that wires and cables, particularly in the winter time, become encrusted with sleet and ice and their diameter considerably increased. Not only does this increase in the surface exposed to the one part to introduce greater stress into pole lines, but the weight of the coating of sleet and snow must not be forgotten as an additional factor. A cubic foot of ice weighs on the average, about 57½ pounds. A coating of ice from ¼ of an inch to ¾ of an inch in thickness is very frequent, and incidents are on record where from an inch to an inch and a half has been measured. So to estimate the stress encountered upon pole lines one must calculate for the effect of wind upon the ice-covered surface together with the additional weight that the burden of snow and sleet imposes.—Abstracted from the *Telegraph Age*.

WEST VIRGINIA INDEPENDENT LINE.

GREAT work is being done by the Consolidated Telephone Company, of Clarksburg, W. Va., and there is no doubt that the next few months will find it one of the most complete telephone systems in the South.

The Waynesburg line, which has been in course of construction for the past couple of months, has been completed and connected up by way of Fairmont. Clarksburg now has connection with Uniontown, Connellsville and all the principal towns in that part of Pennsylvania.

The Wheeling line will be completed soon and then West Virginia's principal city will be on the regular lines of the company. All the towns around Wheeling will have a line as soon as possible, and, upon their completion, the entire northern part of the State will be connected.

Arrangements are being made for a big meeting of telephone managers to be held in Wheeling. At the meeting all the managers of lines in this part of the State will attend. The object of the meeting is to consider matters of mutual importance to the different lines and to discuss subjects which will be to the advantage of the patrons and give them improved service.



Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

REGULATION OF HIGHWAYS.

THE following excellent criticism has been made upon the answer to a query in this department, which was published in a recent number of the paper.

In your issue of December 19th, under the heading of "The Telephone in the Courts," it is stated that under authority of the American Telephone and Telegraph Company vs. Millcreek Township, 46 Atlantic 140, that the commissioners may regulate the location of poles for the accommodation of an Electric Railway Company. Not because this statement is misleading (which it certainly is) do I call attention to it but the importance of it and the financial consequences both of which are very great makes it important that the statement should not go unchallenged.

I do not think that the decision in question goes so far as is intimated and the court does not seem to recognize that it is done for the benefit and accommodation of the Electric Railway Company but rather as a regulation for the better accommodation of public travel. There is no question so prolific of trouble, especially to companies engaged in the construction and maintenance of toll lines, as the interferences by electric railway companies subsequently building along the same road. We have been compelled to bring suits for injunction in numerous cases within the last few years to prevent such interference, but I have yet to find a single court who would compel a telephone company to remove its lines solely for the accommodation of an electric railway company whether at the behest of the commissioners or other road authorities or that of the electric railway company. We have always maintained that where we have secured right of way and established our lines, that the electric railway company must arrange with us as they do with abutting owners, taking into consideration our property and our established rights.

Lines of suburban electric railway, as at present constructed and operated, with the right to run an unlimited number of trains carrying passengers, freight and mail are generally treated by the courts as an additional burden upon the freehold, and as such must secure right of way before constructing their lines, and *per se*, have no greater rights on a public highway than those of a railway operated by steam as against abutting property owners and the established rights of a telephone company.

If the case aforesaid is subject to the interpretation intimated, and that is the law in the State of Pennsylvania, I am sure it will not be followed by the courts of other States. There are various decisions requiring all electric railway companies to pay such expenses as may be incurred by a telephone company, and whether such changes are made for such purpose by order of the road authorities or the railway company itself, would, to my mind, make little difference. Electric railway companies could not indirectly do what they had not the right to do directly.

These interferences are becoming so common in these days of such extensive construction of lines of electric railway companies that it is very important that telephone companies should know their rights and insist upon them. W. L. C.

The editor would call attention to the rule that the discretion of such a board cannot be questioned by the courts unless the regulation adopted is unreasonable. This rule seems to be recognized in the case mentioned. Whether the motive behind the action of the board were the accommodation of an electric railway or not could not be investigated unless there was evidence tending to establish the unreasonableness of the regulation.

A REASONABLE REGULATION.

WILL you please answer following questions through THE TELEPHONE JOURNAL: We have a telephone in the hotel and the Bell Long Distance people have one there also. The manager of the hotel is continually calling parties over our system to come to Long Distance telephone. We presented a bill to Bell people for pay and they refused to pay same. We talked of moving our telephone and the Bell attorney told hotel manager we could not do so. Have we the right to move under circumstances?

Again we have a stockholder and director in bank who is a non-subscriber, but insists on using our system because the bank pays for a business telephone and threatens to bring suit if we do not pass him over. Can all stockholders in a corporation claim such rights? N. O. V.

IT seems that it would be a reasonable regulation to adopt, that your telephones should not be used to call persons to the long distance line of a rival company. People vs. Central New York Telephone Company, 58 N. Y. Supp. 221. If it is a regulation and reasonable you can take your instrument out of the building of one who refuses to obey the rule.

The stockholder in a corporation has the right to use a telephone belonging to the corporation, if the corporation permits him to do so. I know of no case holding this in so many words, but it seems to follow from the interest the stockholder has in the corporation property.

REDRESS FOR UNDERBUILDING.

WHAT redress can a telephone company get from another that parallels its lines by underbuilding? Is there any law regulating this? N. S.

IF one company parallels another company's lines by underbuilding in such a way as to interfere with the prior company's wires, the aggrieved company may secure an injunction restraining the interloper from unlawful interference. This rule is laid down in Northwestern Telephone Exchange Company vs. Twin City Telephone Company (Minn.), 95 N. W. 460. "Underbuilding" was the interference there charged. This case might be used in connection with, and distinction from, Chicago Telephone Company vs. Northwestern Telephone Company (Ill.), 65 N. W. 329, in which "overbuilding" was approved as a proper method of paralleling another company's line.

NICKELS MUST BE RETURNED.

ALL telephone companies doing business in Chicago can be compelled by the council to enclose in boxes or booths all public telephones in the city limits, even if the telephones are used for talks with persons outside of the city or State limits.

The city has the right to pass an ordinance requiring the Chicago Telephone Company to return coins dropped in the slot unless the person calling succeeds in conversing with the person called for.

These principles are laid down in an opinion drawn up by Assistant Corporation Counsel Maclay Hoyne and approved by Corporation Counsel Tolman, for judiciary committee.

As to the nickel dropped into the slot, however, the law department advises the committee that the passage of a returning ordinance might end the city's right to further compensation from the company. This amounted last year to \$85,000.

Constable John Small has brought fifteen suits against the company, in each case to recover a nickel dropped into the slot when he got no service, and has recovered each time with costs. The cost of defence to the company is estimated at \$250.

EFFECT OF POSTMASTER PAYNE'S ORDER IN INDIANA.

THE Independent telephone men of Indiana are much interested in the order of Postmaster-General Payne removing Independent telephones from the post offices in the Northwest. Telephone men are not alone concerned. It is admitted that such an order would prove disastrous in a political sense in Indiana.

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.



A FULLER CELL QUESTION.—(270.)

The solution used the porous cup of our Fuller batteries is plain water slightly salted to cut down the resistance. I have considerable trouble with the zincs becoming crystallized, causing a high resistance. The battery also becomes very noisy. What treatment would you advise when the battery is in that condition?

F. O. W.

The crystallization of the zinc is caused by imperfect amalgamation. Either there is not sufficient mercury in the bottom of

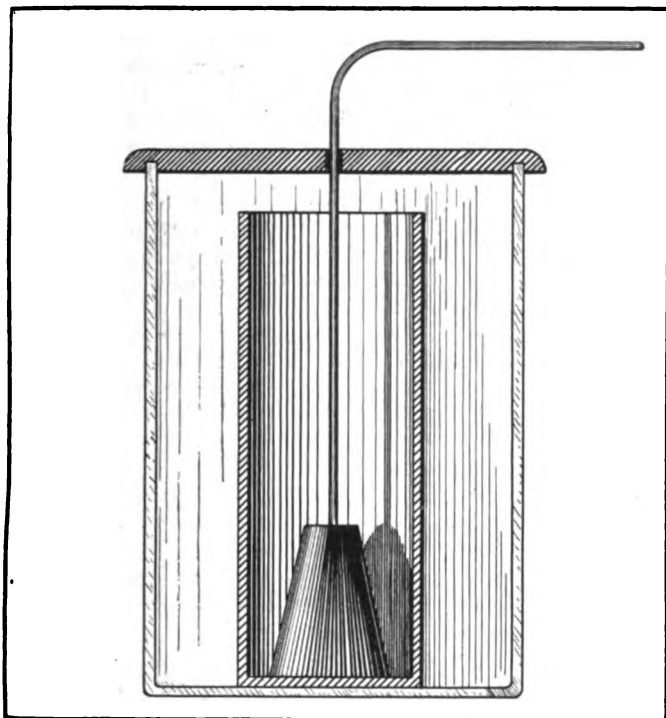


Fig. 270.

the porous cup, or else the copper rod attached to the zinc is bent, so that the zinc cannot feed down into the mercury to take up the waste. The proper method of bending the rod is shown Fig. 270.

CONNECTING SWITCHBOARD TRANSMITTERS.—(271.)

Will you please explain to me how they connect the switchboard transmitters to the same battery in a big telephone exchange, as I understand they do. We have two operators and we tried connecting both operators' circuits to the same battery and one operator could hear everything the other one said.

P. O. F.

The usual method of connecting switchboard transmitters is to attach to the terminals of the battery two very short and very large bars. Often these have two or three square inches of copper. These bars extend to a fuse board. At the fuse board each bar is supplied with a short one ampere fuse. From the end of this fuse an individual lead runs to each operator's transmitter. It is impracticable to successfully serve operator's transmitters unless each one has an individual battery, or unless the leads are individualized to the battery and the battery is of extremely low internal resistance. An ordinary primary battery will not answer for the purpose.

WIRING OF TEST SET.—(272.)

I would like to inquire how a lineman's test set is wired. The one I saw was arranged so as to give the following tests: When the switch was on point No. 1 the instrument was on the line, when on point No. 2 it was bridged, and when on point No. 3 it was in series. How can the generator and buzzer be wired to give the results mentioned?

F. N. W.

Thorough investigation has failed to reveal the existence of a lineman's test set wired up as you mention. The only method of wiring a lineman's test set that we have been able to find that seems to be at all like the one you give is that shown in Fig.

272, where *a* and *b* represent the two line binding posts. When the switch lever is in contact with point No. 1, the receiver is cut into circuit, and the buzzer is out. On the other hand, when the switch lever is thrown over the contact No. 2, the buzzer with the generator in series is cut into circuit, and the receiver is cut out.

INDUCTION COIL PROPORTIONS.—(273.)

Is there any definite electrical law involved in winding an induction coil for the highest efficiency of transmission? If so, what is that law; and what are the factors that enter in to the calculation for size of wire, and number

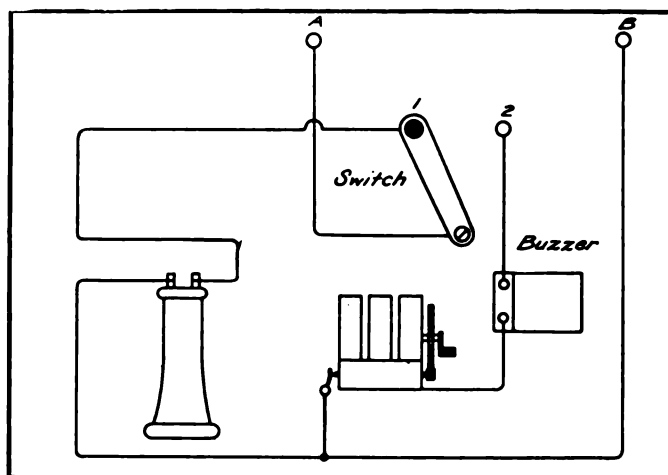


Fig. 272.

of turns of each primary and secondary windings, and the relations that the factors bear to each other? Coil for local battery only to be considered.

U. S. R.

It is possible to express mathematically the relations of the mutual inductance of two coils of wire such as are employed in an induction coil. This mathematically expressed is so complicated and so involved by the different frequencies and by slight differences, such as thickness of insulation of the wire used, that it does not give a practical working rule. The manufacturers of telephone apparatus have by long experience found approximately the proportions best adapted for induction coils. When a new coil is to be made several trial coils are wound, which are considered to be about of the right proportions, and then by test the best one is selected and further improved upon by subsequent experiment, if such a course seems to be desirable.

QUESTIONS ABOUT WIRE.—(274.)

What is the average life of No. 12 B. B. telephone wire?

My lines have been burned badly by lightning, and are rusty. Would you advise me to put in new wires?

I use No. 4 porcelain insulators bolted on cross arms. Is this insulation as good as with glass?

L. W. H.

No. 1.—The life of iron wire varies greatly, depending upon the locality in which it is used. Iron wire has been known to last 25 years, but such life is extraordinary. Iron wire has also been known to fail by completely rusting in two within six months. Such a case is equally out of the usual. In a general way, one is over-sanguine to expect a life of over four or five years under average conditions.

No. 2.—So long as your lines will talk with reasonable satisfaction we would not advise taking them down and replacing them, simply because they are rusty. When they break or have to be replaced, we would advise your using copper wire and not iron. Whenever there is business enough for a 50-mile toll line, such as you describe, the use of copper is warranted.

No. 3.—Porcelain insulators are usually considered better than glass, but in your case, a No. 4 porcelain knob is so much smaller than a glass insulator that the insulation must be considerably less when the knobs are used.

PATENTS ISSUED

IMPROVED SUB-STATION SET.

Edward B. Fahnestock, of New York, N. Y., patents (No. 747,394) an improved sub-station set. The object of the invention is to provide a case which shall sustain and contain sub-station apparatus in a substantial and desirable manner, and which shall permit of easy access for inspection and repairs. This invention is shown in Figs. 1 and 2, Fig. 1 being a longitudinal section and

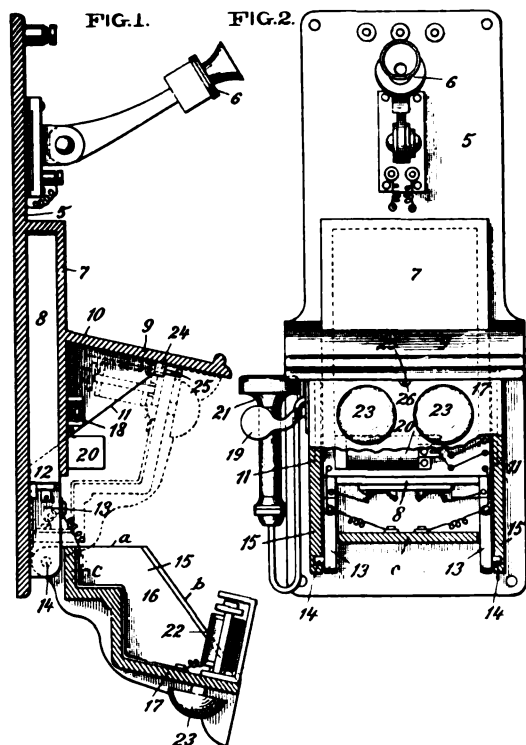
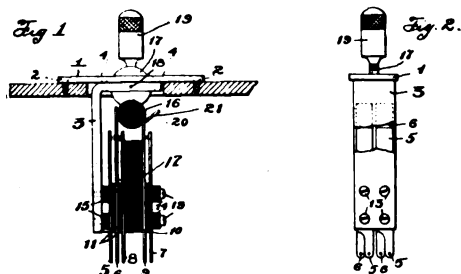


Fig. 2 an elevation. 5 is the base of the case, upon the upper end of which is the transmitter 6. In front of the base is a flat box 7 for the condenser 8. Projecting from the front of this box is the memorandum shelf 9 forming the top of another box 10 which contains the ringer, induction coil, switch hook, and other apparatus. The front of the case is arranged to swing so that the apparatus can be easily inspected.

SWITCHBOARD KEY.

Wm. Meyer, of Chicago, Ill., patents (No. 748,397) and assigns by mesne assignment to the Stromberg-Carlson Telephone Mfg. Co. an improved switchboard key. The object of the inventor

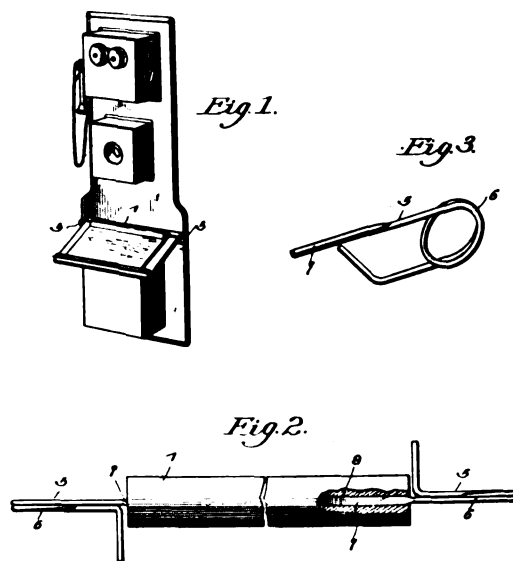


is to produce a key which shall be of the simplest possible construction, which will not readily get out of adjustment, and which is easily removable from the cord shelf for repairs when such are necessary. This invention is shown in Figs. 1 and 2, Fig. 1 a side elevation and Fig. 2 a front elevation. There is a cap plate 1 that supports the key mechanism and holds the same in position upon the cord shelf. To this is secured an angle-shaped plate 3 that forms the support of the key springs 5, 7, 8

and 9. The springs 5, 6 and 8 may be arranged for ringing, while 7 and 9 are placed for listening.

PAPER CLIP FOR TELEPHONE SUB-STATIONS.

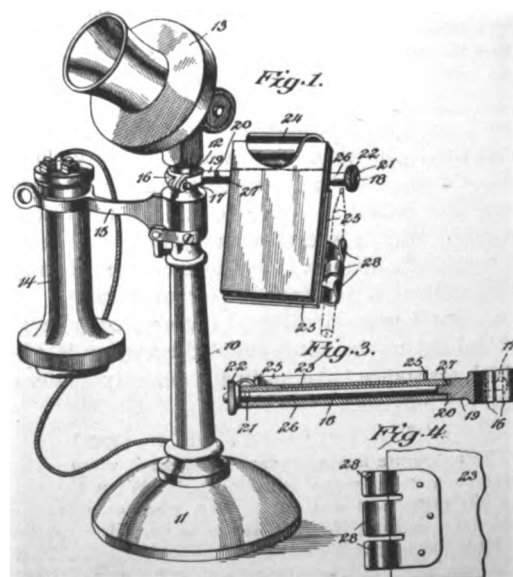
Francis M. Crawford, of Wayland, Mo., patents (No. 748,264) an improved method of holding memorandum paper upon telephone sub-stations. This device is shown as applied to a telephone in Fig. 1, with details in Figs. 2 and 3. The object of the invention is to provide a method of securing sheets of paper upon the tablet of a telephone sub-station. The inventor provides a bar, 1, which is triangular in section, so as to present a



cutting edge to enable sheets of paper to be readily torn off. This bar is secured by means of the clips 5 to the shelf that forms the writing tablet on the sub-station. The clips 5 have coil springs 6, whereby the bar is clamped to the tablet shelf and holds the paper securely in its place.

MEMORANDUM PAD SUPPORT.

James Powers, of New York, N. Y., patents (No. 748,005) and assigns to H. B. Childress an improved method of supporting

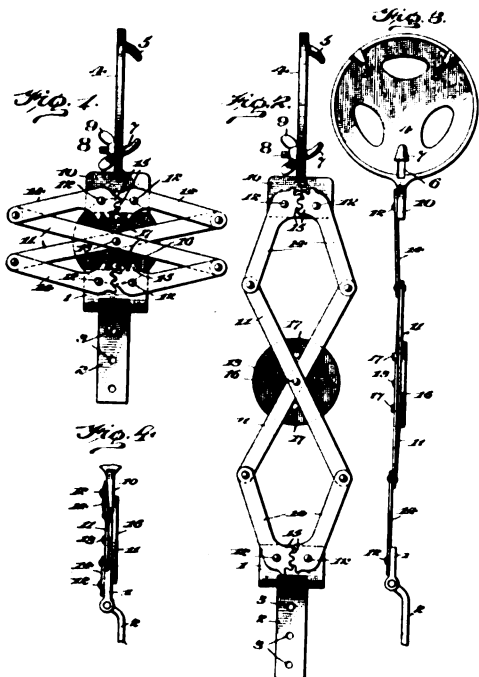


memorandum pads for desk set telephones. The object is to provide a simple support which can be readily attached to any desk set and shall be capable of retaining a memorandum pad

and a pencil in a convenient and suitable manner, and which can be manufactured at a low cost. It is shown in Figs. 1, 3 and 4. The inventor provides a clamp 16, which may be attached to the neck of a desk set. This clamp supports a bar 19, which carries a suitable sized shelf upon which a memorandum pad may be placed and retained by means of the spring or clip 24. At the side of this shelf a pencil support, 28, is formed of three fingers which are pressed out of the metal forming the shelf.

TELEPHONE BRACKET.

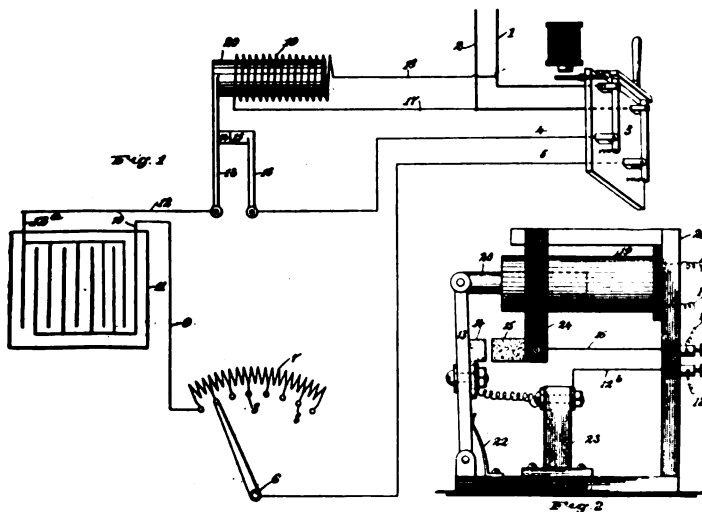
Henry S. Waite, of Columbus, Ohio, patents (No. 746,210) an improved bracket for supporting desk set telephones. This invention is illustrated in Figs. 1 to 4 inclusive. The inventor provides a hinge piece 2, which may be bolted or screwed to any



desired woodwork. Attached to this hinge piece is a pair of lazy tongs 11 that permit the bracket 4 to advance or recede from the hinge 3 at the pleasure of the user of the telephone. The bracket 4 is arranged to support the base of an ordinary desk set, and by this means the inventor provides a method of adjusting the set either vertically or horizontally as may be desired.

IMPROVEMENT IN CIRCUIT BREAKER FOR STORAGE BATTERIES.

Henry Garrett, of Dallas, Tex., patents (No. 746,490) an improved circuit breaker for charging storage batteries. This is

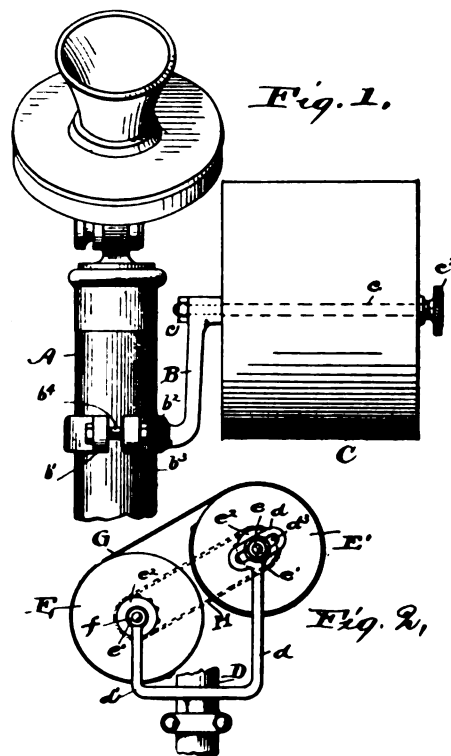


shown in Figs. 1 and 2, Fig. 1 being the circuit and Fig. 2 a detailed elevation. This invention relates particularly to circuit breakers for protection from under load or from a drop in volt-

age. The charging mains are shown at 1 and 2 proceeding to a switch 3, and thence by means of conductor 5 to rheostat 6, through conductor 9 to storage battery 11, thence through conductor 12, contacts 14 and 15, conductor 4, through the switch 3, and back to the side of the line 1. An electro magnet is bridged across the line by means of conductors 17 and 18. This relay holds 14 and 15 in contact, and thus completes the circuit. In case the voltage of the supply mains decreases beyond any amount at which the electro magnet 19 is set, the magnet fails to hold the contacts 14 and 15 together. They spring away from each other and rupture the circuit.

IMPROVED TELEPHONE DIRECTORY.

Frank H. Chamberlain, of Cleveland, Ohio, patents (No. 746,021) an improved telephone directory. The object of this invention is to provide in connection with a desk set telephone a convenient and handy directory. This is shown in Figs. 1 and 2,



from which it will be perceived that upon the pedestal of the desk set a cylinder *E* is clamped by means of the bracket *B*. This bracket carries a second cylinder *E'*, the two cylinders being geared together by the chain *H*. Upon this cylinder a printed directory can be rolled, and by turning the cylinders to and fro any name can be found.

THE LEWIS COUNTY COMPANY'S NEW DIRECTORY.

THE Lewis County Telephone Company, which operates in Canton, Mo., and adjoining territory, has recently issued a new directory of over one hundred pages. The company has all its exchanges at the different towns throughout Lewis County and neighboring counties listed and gives the names and rings for all toll and party lines. There are many advertisements in it, so the book serves for a business as well as a telephone directory. It contains about 1,350 names. The exchanges that the company operates and the number of subscribers in each are as follows: Canton, Mo., 158 subscribers; La Belle, Mo., 83 subscribers; La Grange, Mo., 66 subscribers; Lewistown, Mo., 60 subscribers; Maywood, Mo., 40 subscribers; Monticello, Mo., 50 subscribers; Benjamin, Mo., 32 subscribers; Alexandria, Mo., 13 subscribers; Antioch, Mo., 5 subscribers.

The company has toll connections to Keokuk, Iowa, and Quincy, Ill., and owns about 85 toll and party lines. The directory reserves a blank page for new subscribers and devotes one page to rules and regulations. An alphabetical list of all lines and exchanges is given, so that all connected with the company can be quickly reached.



FINANCIAL

LOS ANGELES, CAL.—The Home Telephone Company has declared a dividend of 4 per cent., payable February 1st, 1904. It is the first quarterly dividend paid by the company. On January 1st the company had 8,254 lines in use and 10,482 instruments connected.

MONROVIA, CAL.—The Monrovia Telephone Company has filed a certificate permitting of an indebtedness of \$25,000.

SAN DIEGO, CAL.—The city council has sold a telephone franchise to Arthur Wright, representing the Home Telephone Company, for \$3,000 in go.d.

DANVILLE, ILL.—The Vermillion County Telephone Company has increased its capital stock from \$150,000 to \$400,000. J. H. Davis is president of the company.

URBANA, ILL.—The Vermillion Telephone Company of Urbana has increased its capital stock from \$150,000 to \$450,000.

DALEVILLE, IND.—The Daleville Telephone Company will issue 200 shares of stock, par value of \$50, and will sell the first 100 shares issued at \$40 in order to raise money to allow the immediate construction of its line.

DENISON, IOWA.—The Crawford Telephone Company of this place will increase its capital stock from \$30,000 to \$80,000.

PRINCETON, MINN.—At the third annual meeting of stockholders of the Minnesota Rural Telephone Company an 8 per cent. dividend was declared. The old directors were re-elected. The officers are: Dr. Armitage, president and secretary; W. G. Armitage, vice-president, and L. Erickson, treasurer.

RIVERHEAD, L. I., N. Y.—The Bating Hollow and Roanoke Telephone Company of Riverhead has filed a certificate with the Secretary of State at Albany, increasing the amount of its capital stock from \$5,000 to \$20,000. The company's directors include A. B. Young, Charles Warner, H. R. Talmage, John C. Young, F. O. Reeve, E. F. Mosier and W. R. Fanning.

TOLEDO, OHIO.—The W. G. Nagel Electric Company of Toledo has increased its capital stock from \$50,000 to \$100,000.

MONTPELIER, VT.—The Orange County Telephone Company has filed a certificate increasing its capital stock from \$10,000 to \$25,000.

FRANCHISES

TOPEKA, KAN.—The Independent Telephone Company, of which Wilder S. Metcalf is a director, has asked for a franchise at Lawrence.

BREWER, ME.—The Bangor Automatic Telephone Company has petitioned the city council for a franchise to operate here.

BALTIMORE, MD.—The Maryland Telephone & Telegraph Company has been granted a franchise at Elkton to use county property in Cecil County for an extension of its line to Crisfield.

CANTON, N. Y.—The Canton & Le Roy Farmer's Mutual Telephone Company has been granted a local franchise. The following officers have been elected: H. F. Landon, president; D. E. Whipple, secretary; L. T. McFadden, treasurer. D. E. Whipple, Thomas Green and H. E. Landon are the directors.

UTICA, N. Y.—The Utica Home Telephone Company has been granted a franchise in Whitesboro four miles West of Utica. It will put in a switchboard to accommodate 700 subscribers.

NORWOOD, OHIO.—The recently incorporated Norwood Citizens' Telephone Company has applied to the city for a franchise.

VAN WERT, OHIO.—A number of farmers are circulating petitions seeking signatures to present to the city council of Van Wert, asking for a local franchise. They are backed by a number of farmers, who will build country telephone lines and also an exchange in this city.

COMBINATIONS

ATHENS, ALA.—Eugene Horton has purchased the Athens Telephone Company, and is preparing to overhaul the plant and put it in first-class condition.

ASHKUM, ILL.—The Ashkum Telephone Company, owned by P. H. Carey, R. R. Meentz and A. B. Bairdslee, has been purchased by the Independent Telephone Company of Martinton. The local exchange, which has 175 subscribers will be remodelled, and it is probable that a new switchboard will be installed.

EL PASO, ILL.—The El Paso Telephone Company has purchased the lines which were put in some years ago by the Peoria & Eastern Telephone Company. The franchise of the old company is included in the sale.

GROVELAND, ILL.—Wm. Ader, of this place, has purchased the New Maysville Telephone Company, and will operate the exchange, commencing with the 1st of March.

WEBSTER CITY, IA.—Representatives of various Independent telephone systems of Hamilton County met here recently and perfected a plan for merging all the companies' into the Hamilton County Independent Telephone Company to secure for their subscribers free connection throughout the county.

ST. JOSEPH, MO.—The St. Joseph Cross Arm & Pin Company has purchased the H. C. L. Telephone Supply Manufacturing Company.

MADISON, NEB.—The local telephone exchange has been purchased by Dr. Condon and John Hugg. The price of telephones will be reduced and a large number of new lines put in. It is intended to form a stock company to take over the exchange.

CLAYSVILLE, PA.—The Claysville Telephone Company, recently organized by T. B. Lee, J. G. Grey and others, has purchased the Claysville exchange of the Federal Telephone Company. They also intend to construct a line to Alexander, where they will install an exchange.

FULLMAN, WASH.—Two of the rural telephone lines centering in Fullman have been combined, and it is proposed that all of these lines shall be consolidated. There are fully 300 miles of such lines. Louis L. Wright maintains the central office here, which does the switching for all the lines.

ELECTIONS

ERIE, ILL.—The Crescent Telephone Company was held here recently and the following officers elected: N. H. Whiteside, president; D. W. Mumma, secretary; R. L. Burchell, treasurer. The directors are W. J. Farber, of Port Byron; Peter Florin and H. Schroeder, of Hampton; F. L. Wake, of Zuma; John Butzen, of Canoe Creek; A. W. Donahoo and Coe W. Wilt, of Erie; F. L. Daymaker, of Newton.

MILLEDGEVILLE, ILL.—The Milledgeville Mutual Telephone Company has elected Samuel Peugh and Sturgeon Thorpe directors.

QUINCY, ILL.—The Quincy Automatic Telephone Company has elected the following directors: Charles T. Dazey, president; Jackson R. Pearce, vice-president; F. W. Osborne, secretary, and J. M. Winters, treasurer; Henry Steinkamp, S. C. Nichols and George P. Behrensmeier.

GOSHEN, IND.—The Home Telephone Company at a meeting held in Elkhart recently elected the following officers: I. O. Wood, president; George D. Lint, vice-president; J. K. Johnston, secretary; H. B. Sykes, treasurer; J. A. Arthur, Chas. W. Miller, J. B. Miller, J. B. Pollard, James Kavanaugh, Dr. I. W. Short and Edw. L. Barber, directors.

BOXHOLM, IA.—The Grant Township Mutual Telephone Company of Boxholm has elected the following officers: Alf Sundberg, president; Alexander Westeen, secretary; E. S. Thorngren, treasurer. John Hocke, Gust Brod, Wesley Swanson, John G. Johnson and Frank Snider, directors.

CRESTON, IA.—The Creston Mutual Telephone Company has elected the following officers: J. C. Sullivan, president; T. K. Wilson, vice-president; John Hackett, treasurer; George Atkinson, secretary. The regular 6 per cent. dividend was declared.

FORT DODGE, IA.—The Fort Dodge Telephone Company has elected the following directors: O. M. Oleson, C. D. Koch, E. G. Larson, C. F. Duncombe, L. A. Thorsan.

LEIGHTON, IA.—The Leighton Rural Telephone Company has elected the following officers: L. S. Walker, president; L. C. Howe, vice-president; D. Nieuendorp, secretary; Ira Cole, treasurer and A. C. Nowell, manager.

NEWTON, IA.—Jasper County Telephone Company of Newton has elected the following officers: H. B. Lizer, La Porte, president; A. H. Burgman, vice-president; H. C. Korf, secretary; C. Greideling, treasurer, all of Newton; J. R. Skinner and P. C. Dings, of La Porte, and F. E. Taylor, T. G. Russell and A. H. Gergnan, of Newton, directors.

UTICA, IA.—The Farmers' Mutual Telephone Company of Utica has elected the following officers: G. F. Howard, Hillsboro, Ia., President; J. H. McSurley, of Keosauqua, vice-president; E. E. Rowe, Hillsboro, secretary; H. B. Sherod, Kilbourne, treasurer. The directors are G. F. Howard, J. V. Brook, Frank Small, H. B. Sherod and J. H. McSurley.

NATOMA, KAN.—The Natoma Central Telephone Company has elected the following officers: George S. Welling, president; S. F. White, secretary; George R. Craig, treasurer. Directors: L. H. Pangburn, George S. Welling, S. E. White, George R. Craig, H. O. Pixley, J. W. Lake, Fred Lindsell, Robert Clark and George Brown. An assessment of 25 cents per month was levied to purchase and build new lines where needed and to add additional wires for the present system. The directors were instructed to negotiate for the purchase of the Bloomington line. A new line will probably be built between Natoma and Elton. The capital stock of the company was increased from \$2,000 to \$25,000.

RAMONA, KAN.—The Ramona Mutual Telephone Company has elected the following officers: R. Telfer, president; A. A. Peterson, vice-president; W. E. Bowen, secretary; O. M. Shirk, treasurer; N. P. J. Sondergard, John Weiss and Staffer Strickler, directors.

TAYLORSVILLE, KY.—The Taylorsville & Bethlehem Telephone Company at a meeting held at Elk Creek recently elected the following officers: William V. Wiggington, president; William McMakin, secretary and treasurer; J. H. Reid, A. A. Beard, Richard Van Dyke, W. V. Wiggington and William McMakin, directors, and Dr. J. L. Long, general manager.

KANSAS CITY, MO.—The directors of the Kansas City Home Telephone Company recently held a meeting in St. Louis, and by a unanimous vote elected O. C. Snider, vice-president and general manager, succeeding C. H. Judson, general manager, resigned. The company will also elect the following officers: F. J. Heim, president; Henry Koehler, Jr., first vice-president; Hugh C. Ward, secretary; Ed. L. Barber, J. S. Brailey, Jr., Arnold Kalman, Max Koehler, Lee Benoist, A. W. Lambert, F. F. Swofford and W. S. Dickey, directors.

UNDERGROUND

LEAVENWORTH, KAN.—The Missouri & Kansas Telephone Company is preparing plans for putting all its wires here underground.

ST. JOSEPH, MO.—City Engineer Floyd is investigating a proposition to have all overhead wires in the principal streets and alleys of the city put underground at a cost of a half million dollars. It is not improbable that the city government will construct conduits and force the public service electric corporations to lease ducts.

PERSONAL

C. M. CAITERJOHN has been placed in charge of the management of the Evansville office of the Cumberland Telephone Company. He was formerly in charge of the office of the Cumberland Company at Boonville, Ind.

JAMES B. DOUGLASS, for several years manager of the Alliance (Ohio) exchange of the Central Union Telephone Company, has been promoted to be manager of the Akron exchange. This also gives him control

of the exchange at Barberton and the one at the Falls. Mr. Douglass will succeed G. A. Miller, who is at present manager of the Akron exchange, and who has been promoted to a responsible position in the traffic department.

W. H. MEAD, of Nunda, will take charge of the county lines of the Citizens' Telephone Company of McHenry, Ill., on February 1. This work was formerly done by George F. Blethen, of Woodstock.

C. L. MOORE has been appointed superintendent of the Bowling Green, Ky., exchange of the Independent company.

G. E. PHILLIPS, who has for some time been superintendent of the Greenville, N. C., telephone exchange, has been transferred to Rocky Mount. His brother, H. M. Phillips, of Henderson, succeeds him as superintendent of the Greenville exchange.

GEO. H. PIERCE, who formerly represented the Stromberg-Carlson Telephone Manufacturing Company in New York and New Jersey, has recently entered the employ of the International Telephone Manufacturing Company of Chicago, and has been assigned to the Iowa territory, with headquarters at Des Moines.

C. C. RICE, of Pound, Wis., has been appointed manager of the entire toll line system of the Wausaukee Telephone Company, and the duties of A. W. Larson have been restricted to the management of the Wausaukee local exchange.

M. E. TAYLOR, district inspector of the United States Telephone Company, has been promoted from the Galion district to the Dayton district, which is the twenty-third district of this company. It has just been opened and takes in from 20 to 50 towns and cities.

MISCELLANEOUS

NAUVOO, ILL.—At a meeting of directors of the Nauvoo & Colusa Telephone Company it was decided to discontinue the use of its switchboard at Nauvoo, and to connect the lines with the J. A. Bortz system, which gives connection over Western Hancock County and also southeastern Iowa.

CAMDEN, IND.—A meeting of the Camden Co-operative Telephone Company was held recently. Reports were made by the division superintendents, showing the lines all in first-class condition and several new telephones to be placed. A trunk line from Burrows switchboard has been connected with the Camden board, and the matter of connections with the Miller system has been discussed. The secretary and treasurer's report shows the company in good shape financially. The matter of the company renting telephones to subscribers was discussed, and it is probable that a number of telephones will be put in on this plan. The Camden company now has forty-seven stockholders.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company's new automatic service has been cut over. About 5,000 telephones were switched from the old to the new service in less than 60 minutes and about 100 telephone girls let out.

BROOKFIELD, N. Y.—A meeting of the stockholders of the Brookfield Telephone Company was held at the office of N. A. Crumb recently. It was voted to accept the new Stockwell line, which is 2½ miles long, and nine shares of stock were issued to the telephone owners of the line. The officers reported that a contract had been made with the D. L. & W. Railroad Company for three years. The business will probably increase to that extent that a paid central will become a necessity in the near future.



New Construction in the Field



LOS ANGELES, CAL.—The Home Telephone Company will open its exchange at Hollywood on January 15th, and at Pasadena about February 1st. Long distance connections are now being made with Hollywood Long Beach, San Bernardino, Compton and intermediate points.

SAN DIEGO, CAL.—The San Diego-Julian Telephone Line is considering improving its system.

HOPEDALE, ILL.—The Farmers' Telephone Exchange here has opened for business with over 200 patrons, in charge of Arthur Hecker. The same company will install an exchange at Washington, Ill.

MILLSTADT, ILL.—Farmers of Millstadt are demanding of the business men of the village of Millstadt the organization of a company to construct a local and rural telephone system. The farmers have volunteered their services free of charge and their poles for use in donation of the proposed system.

SAINT ANNE, ILL.—At a recent meeting of the West Saint Anne Telephone Company it was decided to add several lines in the spring.

BALTIMORE, IND.—The Diamond State Telephone Company is constructing lines to connect several small towns in Sussex County, Delaware. An exchange will be installed at Frankfort and connections made with Bethany Beach, Roxana, Dagsboro, Selbyville, Bayard, Omar, Millville and Ocean View.

BLUFFTON, IND.—Citizens of Craigville have asked the United Telephone Company of this city to construct a line to Craigville and install a

local exchange. The Bell Telephone Company has a system in Craigville, but the service is extremely unpopular.

MILO, IA.—Two new rural telephone lines were connected with the local exchange recently.

WATERLOO, IA.—The U. S. Telephone & Telegraph Company has filed a deed of trust to the Federal Trust & Savings Bank of Chicago to secure \$200,000 first mortgage 8 per cent. gold bonds, maturing January 2, 1924.

PORTLAND, ME.—The line of the Northeastern Telephone Company to Gorham has been opened, giving connection with Westbrook, North Scarborough, West Gorham and Standish over this company's lines.

MONROE, MICH.—The Monroe County Telephone Company has set up its poles nearly to the Wabash & Ann Arbor Railroad station. The company intends to build a toll through to Ann Arbor, and as soon as possible will establish a new exchange in this city. At Dundee the company has over 200 subscribers, and has extended its toll lines to Azalia and is now building into Cane.

HALSTAD, MINN.—Farmers and business men of Halstad will construct a rural telephone line, to connect with the Hendrum-Perley system, and also a line to Ada. An exchange will be installed here, and if connection cannot be made with the Ada exchange a switchboard will be installed at that place.

CARTHAGE, MISS.—B. W. Stewart has met with sufficient encouragement here to warrant him in installing a local exchange.

BOOK REVIEWS

LA TELEGRAPHIE SANS FIL is a little brochure in French of some 63 pages and 88 illustrations that is a translation of a series of articles which have recently appeared in *The Scientific American* describing particularly Mr. Marconi's work in connection with wireless telegraphy. It is published by Ramlot Freres Et Sours, rue Grétry, 25 Bruxelles, price 50 cents.

The pamphlet commences with a description of the discovery of Hertzian waves and the convention of the discovery. It then takes up Mr. Marconi's early experiments which are described in full, together with many illustrations of the various kinds of apparatus which he has, from time to time, employed. Succeeding this, the last half of the pamphlet is a description of the various wireless telegraph stations that are now in operation. As a condensed summary of this fascinating electrical application, the pamphlet is to be commended.

TRADE NOTES

J. S. Boggs, of Albany, Georgia, who makes and sells yellow pine cross arms, has favored us with a very attractive calendar for 1904. Two fine looking young ladies printed in color compose a group on the calendar's face and are embracing each other. This is where the "cross arms" comes in. The thought is a happy one, indeed.

THE MONTAUK FIRE DETECTING WIRE COMPANY, of 100 Broadway, New York City, has issued a little pamphlet describing its ingenious method for fire alarms. The company offers a peculiarly constructed wire which consists, first, of a central core formed by a small copper wire which is surrounded from end to end by a sheath of easily fusible metal. Outside of the fusible sheath is a layer of insulation. Then comes an overlaying braid of fine copper strands, forming the second conductor of the pair. Surrounding this braid is the rubber insulation that maintains the electrical integrity of the whole. The insulation which separates the fusible sheath and the wire braid is woven of a coarse fibre. If the wire becomes hot at any point, the fusible sheath surrounding the inner conductor melts and running through the braid short circuits the two sides of the line and thus closes the circuit of an alarm bell properly located. It is easy to manufacture the sheath, for any desired fusing limit. Four styles are offered fusing respectively at 160 degrees Fahrenheit, 200, 300 and 370 degrees. By using this style of wire in installing annunciators, bells, or telephones in any building a fire alarm is combined with the other apparatus and it is easy to see as this fusible sheath extends throughout the entire structure of the building it is protected in the most thorough and comprehensive manner.

THE AMERICAN STEEL & WIRE COMPANY, of Chicago, New York, Worcester, Denver and San Francisco, has issued a catalogue which is interesting to the telephonist as well as to the general metal user, for it is an exceedingly complete list of everything in the form of wire which one is likely to want. This list of products is not a catalogue strictly, for, as its name indicates, it is a schedule of the various products made by the American Steel and Wire Company and refers to their more extended catalogue for fuller information. Telegraph and telephone wires, spring wires, special market wires, special and miscellaneous wires including aluminum, bronze and half a dozen other metals are listed. Then come wire nails, spikes, pole steps, strands, electric wires and cables. A special department is given springs and all sorts of woven wire. To construction men such a list is of particular value and we recommend those interested in this branch of telephone work to obtain the list.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—1,000 series telephones in the best of condition and ready for immediate delivery, \$4.00 each. Address, C. H. A., care **THE AMERICAN TELEPHONE JOURNAL**, 1263 Monadnock Building, Chicago, Ill. 127

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION—Wanted in an exchange of not over 200 to 250 subscribers, in Missouri preferred, by a telephone man with a technical education. Address, Box 123, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 123

POSITION.—Wanted as manager or superintendent of an exchange of 200 to 800 subscribers. Satisfaction guaranteed. Seven (7) years' experience. State salary. Married, strictly temperate. Address, Box 129, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 129

POSITION—Wanted by telephone man with eight years' experience with Bell and Independent companies. Best of references from present and former employers regarding work and character. 26 years of age; married; strictly temperate. Address Box 120, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 120

WANTED—Superintendent and trouble-man, to take charge of exchange of 300 subscribers, sixty-five miles from New York City. Address, Box 130, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 130

MANAGER—A good, live, energetic, capable man of experience wanted to manage a large Independent telephone system in the West. Must be able to invest not less than \$10,000 in the company. Address Box 102, **THE AMERICAN TELEPHONE JOURNAL**, No. 116 Nassau street, New York City. 102

FOR SALE.—To any industrious young man, a full course in Telephone Engineering. Qualifies for position as engineer in any company. Cheap. Cash or instalments. C. L. W., Box 51, Station A, Boston, Mass. 128

POSITION.—Wanted, a position as manager, purchasing agent or both, with an Independent Telephone company. Good references. Am now salesman with large supply house and familiar with all factory costs. Can save you money on your purchases. No objection to location. Can accept Feb. 1. Will consider an offer as salesman of electrical supplies. Address, Box 124, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 124

POSITION—An energetic, tactful, diligent young man of executive ability, with practical experience in telephone work, and an eastern technical education, wishes to again enter the telephone field in the East, Middle West, or South. Has for the past year been engaged in business in New York City in a work allied to Telephony. Would accept a position as manager of a plant of four or five hundred subscribers, and could please patrons and give results; or would connect himself in any capacity he was qualified to fill, with a telephone corporation. Address, Box 126, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau St., New York City. 126

**"Maltby Poles are the Ones to Buy and
'Perfect Service' the Reason Why"**

Proof—Our constantly increasing list of satisfied customers. Won't you join them?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Empire Building.**

"From the Stamp to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

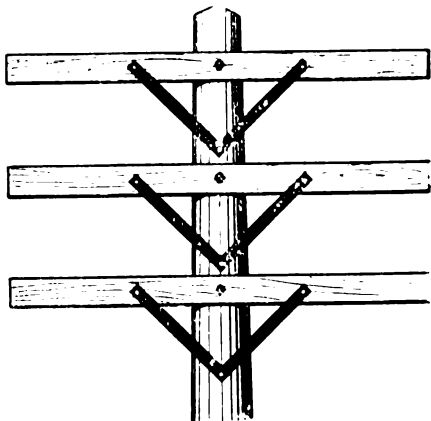
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

PRODUCERS NOT JOBBERS

CEDAR POLES

**LOWEST PRICES
IN CARLOAD LOTS**

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 S. GREEN ST. CHICAGO.

Cedar Poles

Large Stock

Prompt Ship-

ment.



LONG

POLES

A

SPECIALTY

JOHN H. FOWLER,

General Office, 1706 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANPOSITION PINS, etc. a specialty.

ELKIN MACHINE CO.
ELKIN, N. C.

TIES

YELLOW PINE STOCK,
100,000 6" x 8" x 8 FEET,
Chestnut and Oak, large
stock, standard sizes.

Manufactured by

EOCLESTON LUMBER CO.,

29 Broadway, NEW YORK.

POLES

(Southern White Cedar) long
leaf Yellow Pine, octagonal
and square, Chestnut and
Cypress.

YELLOW PINE CROSS ARMS,
PINS AND BRACKETS.

Prompt deliveries from stock. New York
city yard, or direct from mills.

The Morse
Cedar
Co.

CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.

Saginaw,
Mich.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND

Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS

87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet.

74 CORTLANDT STREET,

NEW YORK CITY

We Make a Specialty of Telephone Poles.	P O L E S	Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines
YARDS: Menominee, Mich. Escanaba, " Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.		FRANCIS BEIDLER & CO. 459-519 W. 22d St. CHICAGO, ILL.

J. W. Middleton & Co.
PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

BUTTERFIELD, J. F.**ELECTRICAL ENGINEER
AND CONTRACTOR " " "**Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.**LE ROY W. STANTON****Consulting Telephone Engineer**Plans, Specifications and Supervision of Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.**W. H. CRUMB
& COMPANY****Engineers
Contractors****Telephone Engineering
and Construction**Plans, Specifications and Estimates
Promptly Furnished.

MERITORIOUS INDEPENDENT TELEPHONE ENTERPRISES FINANCED. ✱

**1263 Monadnock Bldg,
CHICAGO, ILL.**Tell the Advertiser you saw his
announcement in**The American
Telephone Journal.**

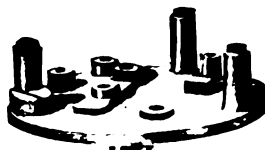
These Pieces Have Not Been
Turned, Bored, Reamed, or the
Gear Teeth Cut. Each Piece Was
Done at One Operation—Die Cast
—and Comes to You Ready to Assemble.

Understand, these are not common foundry castings, they are finished castings finished as correctly and oftentimes better than they could ever be machined.

"Die Casting" of these small parts is a short cut to immediate results, and cuts off many a dollar in costs and all of the trouble from foundry to

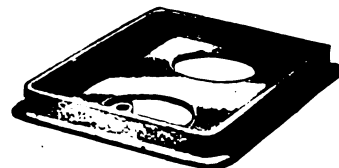
assembling. You do not even have to keep track of the pattern. We make the pattern and deliver you the goods fit and ready.

One good way to find out about these "Die Castings" is to let us send you a sample or so to look over.—Anytime.—the sooner the better.

**Franklin Mfg. Co.**

200 S. Geddes St.

Syracuse, N. Y., U. S. A.

**THE IMPERIAL FINANCE & CONSTRUCTION CO.****CAPITAL. \$250,000.00.****Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.****GENERAL CONTRACTORS**

Telephone propositions financed, engineering estimates and reports promptly furnished.

**WESTON STANDARD
PORTABLE
DIRECT READING**

Voltsmeters, Ammeters, Millivoltmeters, Voltmeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

**Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.**BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION**The Standard for Rubber Insulation****Okonite Wires, Okonite Tape,
THE OKONITE CO., Ltd.**WILLARD L. CANDEE, |
E. DURANT CHEEVER, | Managers**Manson Tape, Candee Weather-Proof Wire**SOLE MANUFACTURERS
288 BROADWAY, NEW YORKGEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

ADVERTISERS



THE American Telephone Journal has the widest circulation among people who buy telephone material of any other publication. These buyers read it, and patronize its advertisers. Should you not secure a share of their trade?

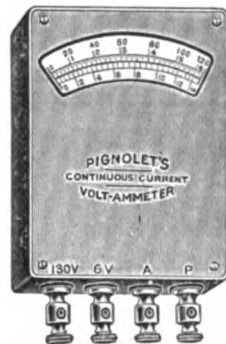
Copy for advertisements should be in New York Office not later than Tuesday noon preceeding date of publication.

American Telephone Journal

IT'S SO EASY TO TEST

with one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.



LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects.

Below will be found a partial list from which you may make your selection.

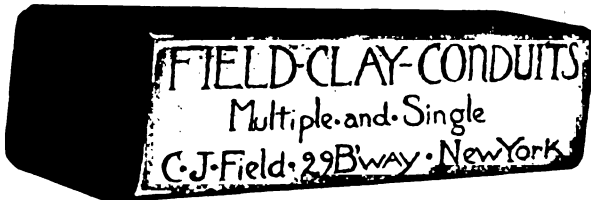
Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

<input type="checkbox"/> A B C of the Telephone.....\$1.00 By J. E. Homans.	<input type="checkbox"/> The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
<input type="checkbox"/> Diagrams of Electrical Connections......50	<input type="checkbox"/> Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
<input type="checkbox"/> Induction Coils.....\$1.00 By H. S. Norrie.	<input type="checkbox"/> Practical Electrica. This volume could rightly be called an Electric Encyclopedia......75
<input type="checkbox"/> Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	<input type="checkbox"/> Systematic Treatise on Electrical Measurements.....\$1.00 By H. C. Parker.
<input type="checkbox"/> Arithmetic of Electricity.....\$1.00 By T. O'Connor Sloan.	<input type="checkbox"/> Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
<input type="checkbox"/> Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	<input type="checkbox"/> Electrical Catechism.....\$2.00 By George D. Shepardson.
<input type="checkbox"/> Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	<input type="checkbox"/> American Telephone Practice.....\$3.00 By Kempster B. Miller.
<input type="checkbox"/> The Electric Telephone.....\$6.00 By G. B. Prescott.	<input type="checkbox"/> How to Make and Use the Telephone.....\$1.00 By George H. Cary.
<input type="checkbox"/> The Inspector and Troubleshman.....\$1.00 By A. E. Dobbs.	<input type="checkbox"/> The Telephone......50 By Prof. A. E. Dolbear.
<input type="checkbox"/> Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	<input type="checkbox"/> The Telephone, the Microphone and the Phonograph..... By Count Dumoncel.
<input type="checkbox"/> Practical Features of Telephone Work......75 By A. E. Dobbs.	<input type="checkbox"/> Practical Information for Telephonists..... By T. D. Lockwood.
<input type="checkbox"/> The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	<input type="checkbox"/> Elementary Treatise on Electric Batteries.....\$2.50 By A. Niandet. Translated by L. M. Fishback.
<input type="checkbox"/> Small Accumulators......50 By Percival Marshall.	<input type="checkbox"/> Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
<input type="checkbox"/> The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	<input type="checkbox"/> Conduits for Telephone Work......50 By Arthur Vaughan Abbott.
<input type="checkbox"/> Induction Coils.....\$1.00 By G. E. Bonney.	<input type="checkbox"/> Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
<input type="checkbox"/> Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	<input type="checkbox"/> Patents and How to Make Money Out of Them.....\$1.25 By W. R. Hutchinson.
<input type="checkbox"/> Electric Instrument Making for Amateurs......50 By S. R. Bottone.	<input type="checkbox"/> Wireless Telegraphy.....In Press. By C. H. Sewall.
<input type="checkbox"/> Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	<input type="checkbox"/> A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
<input type="checkbox"/> The Telephone.....\$1.00 By William J. Hopkins.	<input type="checkbox"/> A Practical Guide to the Testing of Insulated Wires and Cables.....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal - 116 Nassau Street, CITY OF NEW YORK



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarred by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C. & Co., Montreal, Can.

MAGNET STEEL.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Eccleston Lumber Co., New York.
Elkin Machine Co., Elkin, N. C.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Bissell Co., The F., Toledo, O.

Beidler, Francis, & Co., Chicago, Ill.

Eccleston Lumber Co., New York.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.

Fewler, John H., Chicago, Ill.

Huebel, C. J., Co., Menominee, Mich.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Lindley Bros. Co., Chicago, Ill.

Maltby Lumber Co., Bay City, Mich.

Michigan Cedar Co., Bay City, Mich.

Morse Cedar Co., Saginaw, Mich.

Pacific Coast Pole Co., Spokane, Wash.

Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY—Continued.

Sand Point Cedar Co., Sand Point, Idaho.
 Sterling, W. C. & Son, Monroe, Mich.
 Townsend Cedar & Supply Co., Chicago, Ill.
 Valentine-Clark Co., Chicago, Ill.
 Wisconsin Timber & Land Co., Mattoon, Wis.
 Worcester, C. H., Co., Chicago, Ill.

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Conn. Tel. & Electric Co., Meriden, Conn.
 Ericsson Telephone Co., N. Y.
 Holtzer-Cabot Elec. Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.
 Holtzer-Cabot Electric Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Telephone Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Barr, W. J., Mfg. Co., Cleveland, Ohio.
 Bissell Co., The F., Toledo, O.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnestock Transmitter Co., New York.
 Holtzer-Cabot Elec. Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Leslie, A. C. & Co., Montreal, Can.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 McIntire Co., C., Newark, N. J.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
 Bissell Co., The F., Toledo, O.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 National Wire Corporation, New Haven, Conn.
 Okonite Co., New York.
 Roebbling's Sons Co., John A., Trenton, N. J.
 Scovill Mfg. Co., Chicago, Ill.
 Standard Underground Cable Co., Pittsburg, Pa.

Bituminized Fiber Conduit

—FOR—

UNDERGROUND CONSTRUCTION

ELECTROLYSIS-PROOF

WATER-PROOF

A Smooth Laminated Insulator of Unchanging Durability

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate.

The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods. It saves sixty percentum of freight and handling charges and twenty percentum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths.

Bends of all angles.

For illustrated book and information apply to

American Conduit Co.

170 Broadway, New York, N. Y.

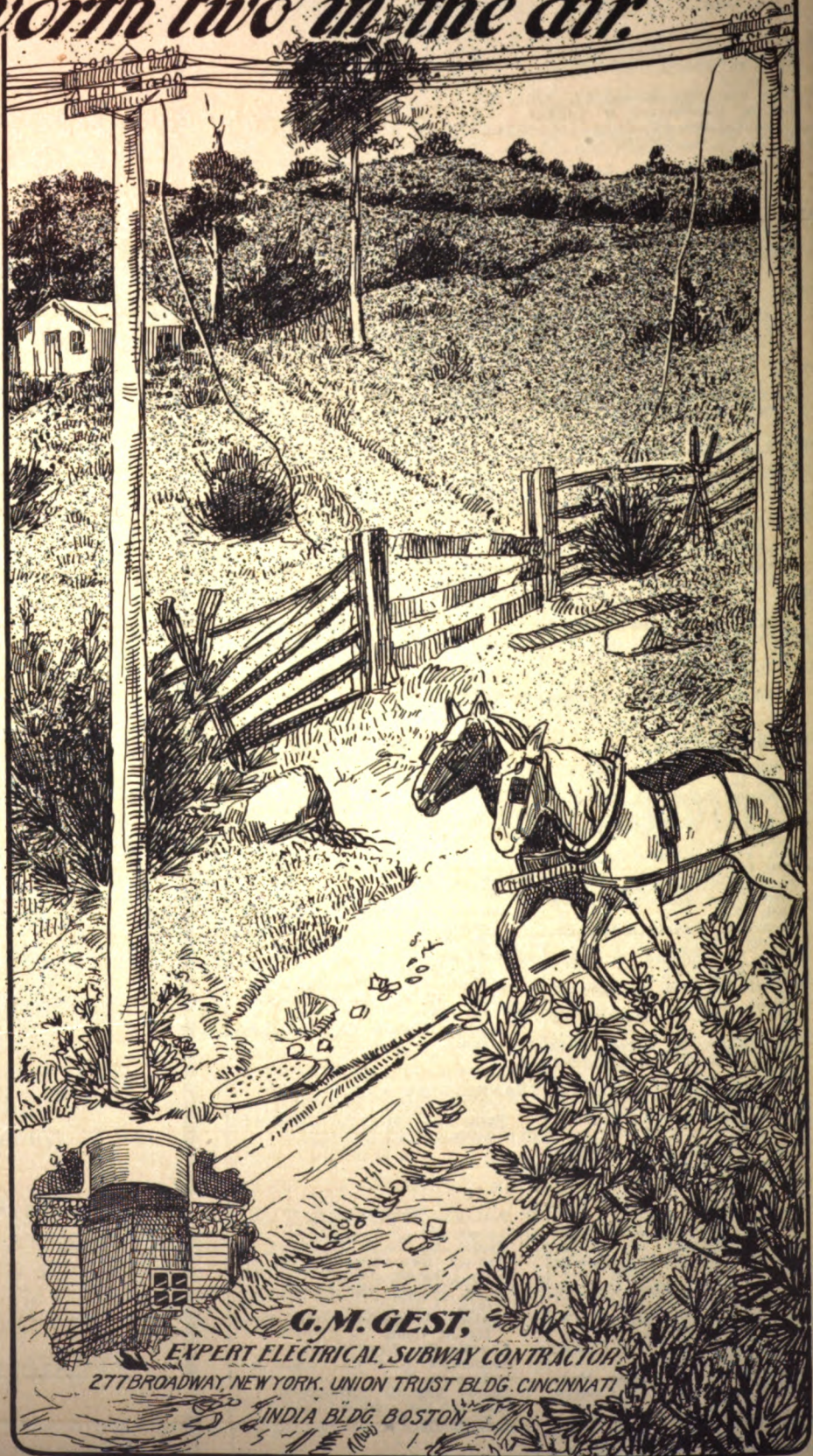
336 Macy Street
Los Angeles, Cal.

822 Manhattan Bldg.
Chicago, Ill.

or to any of the offices of the

Western Electric Company

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,

EXPERT ELECTRICAL, SUBWAY CONTRACTOR

277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI

INDIA BLDG. BOSTON

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of
Philadelphia how they like our conduit. They
should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

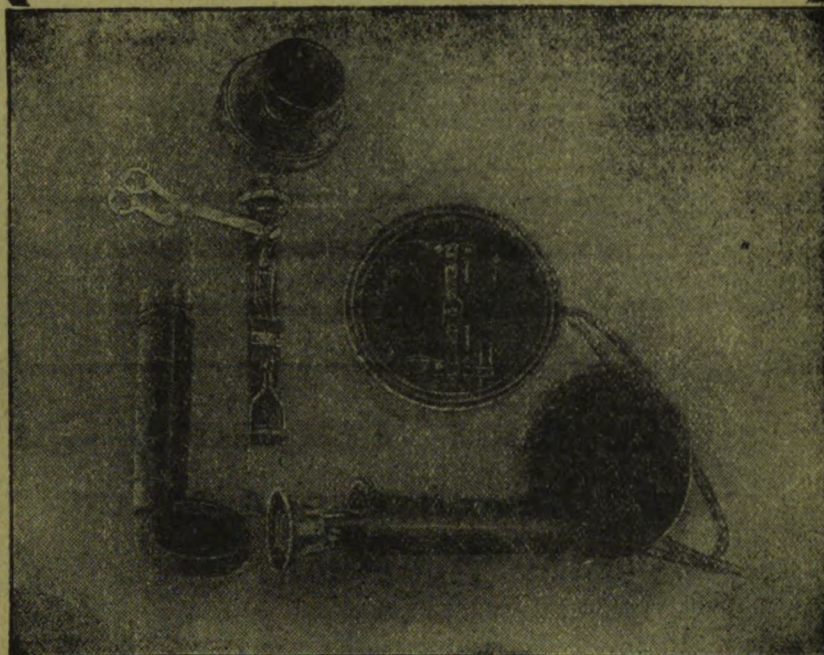
The AMERICAN TELEPHONE JOURNAL

BUY IT NOW

Equipped With
AMERICAN BEAUTY
TRANSMITTER



HERE
IT
IS



THE
ONLY
ONE

NO. 4351, DESK STAND.

BELL
STYLE
RECEIVER



A
PATENTED
ARTICLE

AMERICAN ELECTRIC TELEPHONE CO.

36-58 West Jackson Blvd.,

CHICAGO, ILL.

THE AMERICAN TELEPHONE JOURNAL

NOT BOASTFULLY DO WE SAY

that the American Telephone Journal has no peer in its field. To say this would not make it a truth. But there are abundant proofs. Read the following:

"After reading your paper whenever I could get one from our manager, I realize the only way to read it regularly (which I find necessary) is to become a subscriber. I therefore send you a dollar.

*"A. F. BRANN, Electrician
Henderson Tel. & Teleg. Co.,
Henderson, Ky."*

This letter, together with over a thousand and a half more, prove that merit wins. If you have not sent us a dollar, do it NOW.

52 for \$1.00.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—JANUARY 30, 1904—CHICAGO Number 5

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

AUSTRIAN TELEPHONIC METHODS.....By Carl V. Wisman
CONVENTION OF NEBRASKA INDEPENDENT ASSOCIATION.....By W. J. Stadelman
SOME REMARKS ON INSTRUMENT SETTING.....By B. C. Wilhelm
A GOOD CORD CIRCUIT SCHEME.....By George Bergh

The Operating Field:

POSTMASTER PAYNE'S ORDER WON'T STAND
POSTMASTER PAYNE'S ORDER IN WEST VIRGINIA
YORK STATE'S FIRST ANNUAL MEETING
COLONIAL COMPANY'S ANNUAL MEETING
OHIO INDEPENDENT CONVENTION
INFORMATION REGARDING SWITCHING RATES WANTED
ILLINOIS TELEPHONE AND TELEGRAPH CO. CHANGES ITS NAME
CANADIAN INDEPENDENT EXCHANGES ENLARGED
MEADVILLE COMPANY RECEIVES
THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 80.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK** ❧ ❧ ❧

Estimates given on Metal Telephone Parts or Special Articles of Brass, Copper, German Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

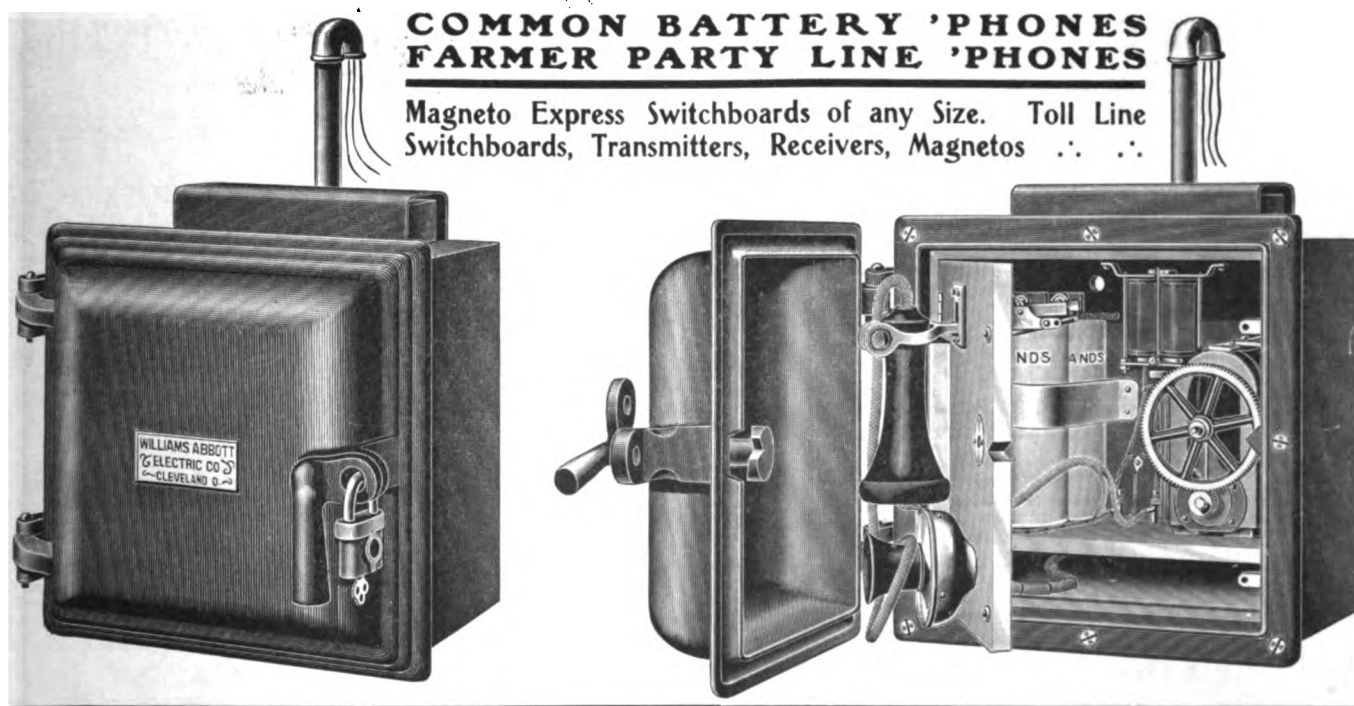
A customer remarked upon going thru our immense warehouse and shipping room that we apparently were not very busy.

Yet at that time we were experiencing one of the biggest rush weeks of the year; but due to the systematic and methodical manner in which orders big and little were being laid out and packed this man thought we were not busy. His idea that confusion and bustle were necessary is not uncommon, and is one of the regrettable features of many business houses. Confusion, disorder, commotion, flurry and excitement all mean mistakes, delays, breakage and losses.

None of this in our business. No money in it. Adds an easy 10% to cost of doing business. Adds a 5 or 10% on the customer before the year is done. Cut it out before it costs you. Catalogue upon request.

ELECTRIC APPLIANCE COMPANY, CHICAGO.

Iron Box Telephones for Railway and Mine Use

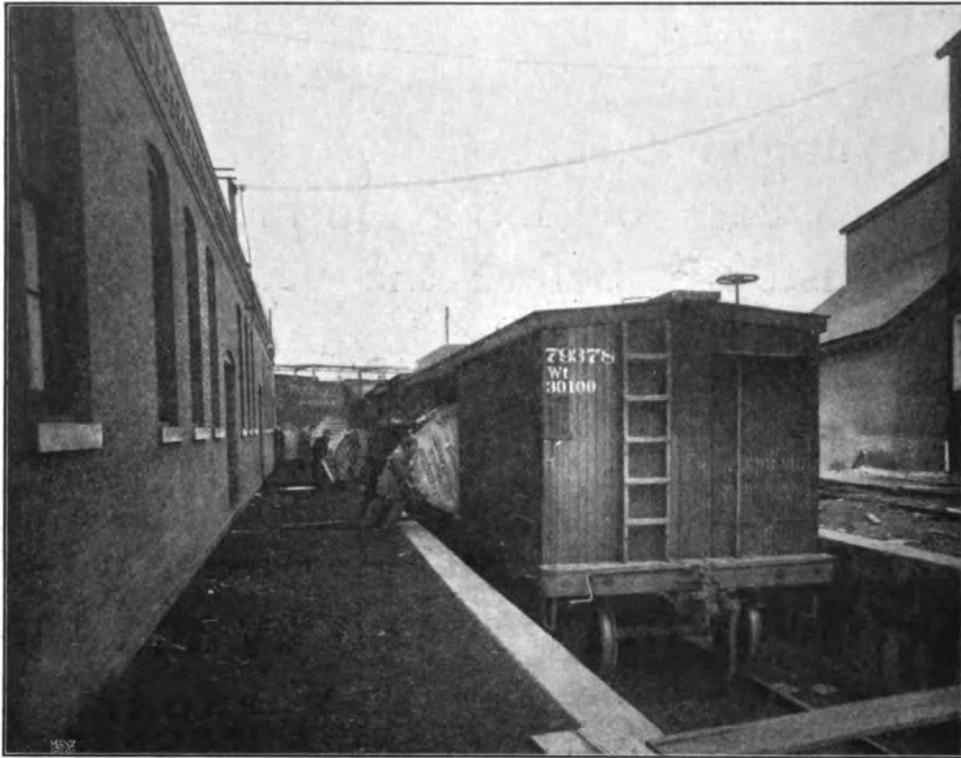


THE WILLIAMS-ABBOTT ELECTRIC CO. 8-10-12 Columbus St. CLEVELAND, OHIO

Stromberg-Carlson Lead Covered Cable

is the same high grade as all their other products. For the benefit of those who are not familiar with our apparatus we can simply say

WE GUARANTEE SATISFACTION



SHIPPING FACILITIES AT OUR ROCHESTER FACTORIES.

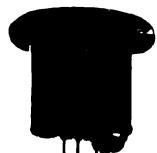
Our facilities enable us to make cable to meet any specifications. When in need of such material let us know your requirements and we will gladly quote prices.

STROMBERG-CARLSON TEL. MFG. CO.

General & Eastern Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.

Get a Pendant "It Hangs at Hand"



SUSPENDED FROM A CEILING CABINET

IT IS ON NOTHING
BEHIND NOTHING
IN THE WAY OF NOTHING

It Costs Nothing

more than the ordinary desk 'phone though exactly as efficient and durable, much handsomer, and possessing, besides absolute adaptability, other commendable qualities peculiar to itself.

ASK FOR IT
WRITE FOR DESCRIPTIVE MATTER

The Vought-Berger Company

Makers of High Grade Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN



CN 152

"The memory of quality lasts long after price has been forgotten."

You
Cannot
Outgrow a

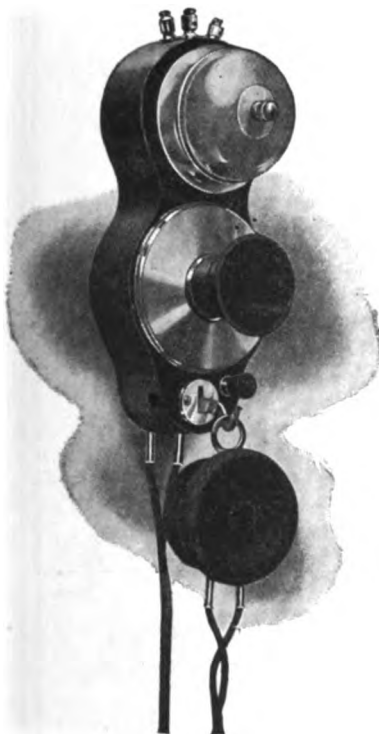
Unit-Type Switchboard

Enlarged as growth demands

For particulars write to

THE NORTH ELECTRIC CO.

156-166 ST. CLAIR STREET, CLEVELAND, OHIO



No. 10

ORIGINATED
BY US

Fitted with our celebrated No. 30 Transmitter, Roller-Bearing Switch Hook and Self-Contained Strap Key.

The best telephone ever devised for private lines, or for school, hotel and residence systems.

WRITE US
FOR
BULLETINS

NEW ENGLAND'S
LEADING
TELEPHONE
MANUFACTURERS

S. H. COUCH COMPANY

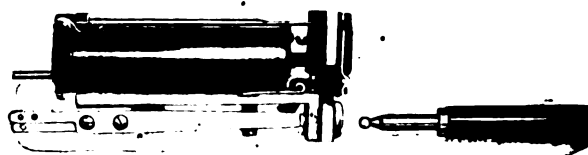
162 Pearl Street

Boston, Mass.

**INTERNATIONAL
Telephone Mfg. Co.**

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**

CHICAGO, ILL.

Multiple Switchboards

**T
E
L
E
P
H
O
N
E
S**

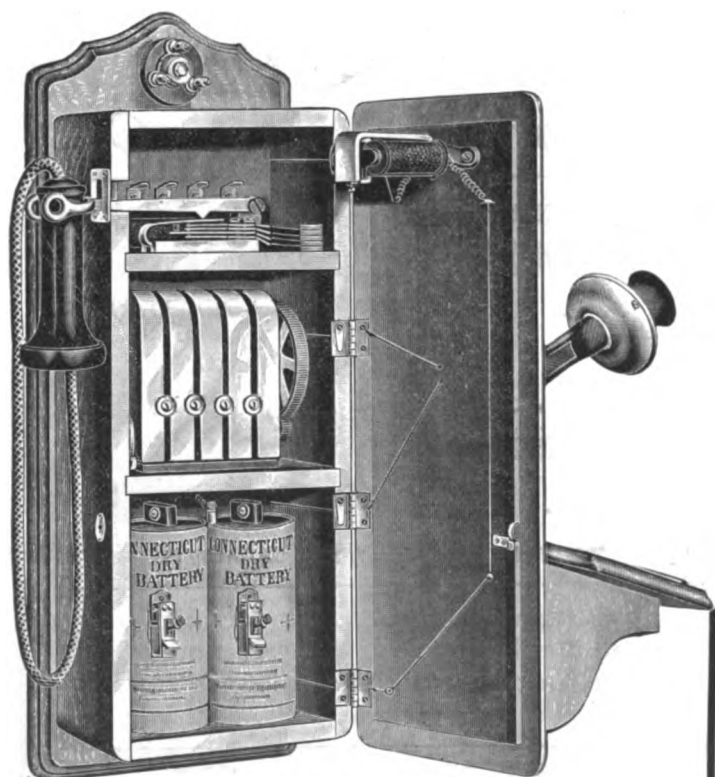
COMPLETE LINE MANUFACTURED BY



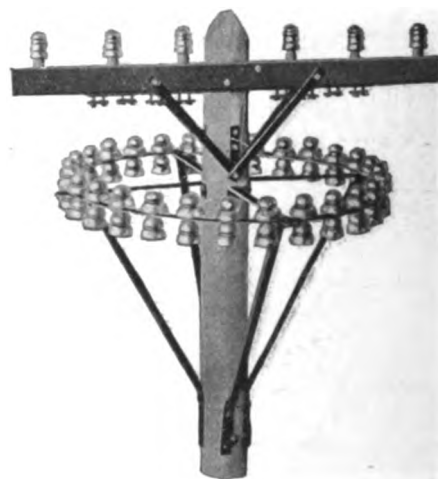
LA FAYETTE, INDIANA

**T
E
R
M
I
N
A
L
S**

PROTECTIVE DEVICES



Strongest and best Telephone on earth
The special quantity price will interest you
**CONNECTICUT TELEPHONE
AND ELECTRIC CO.**
MERIDEN, CONN., U. S. A.



Pole Distributing Rings

Ours are provided with Superior
Insulation ∴ ∴ ∴

New Bulletin '2330 tells about
them, and other good things

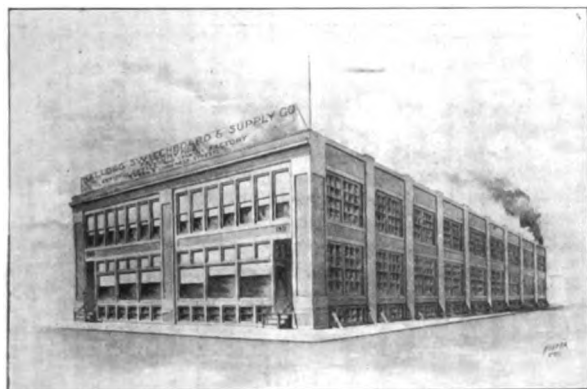
THE F. BISSELL COMPANY.
TOLEDO, O.

Kellogg Switchboard and Supply Company

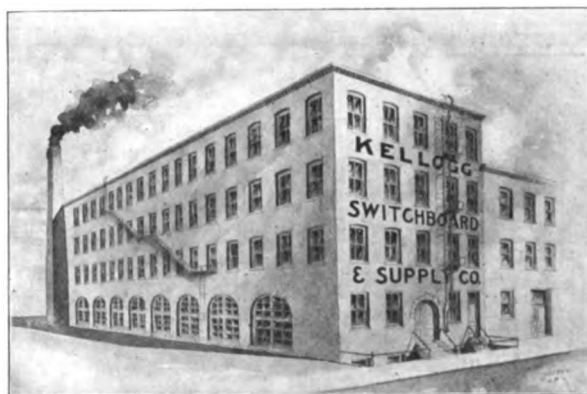
CHICAGO, ILL.



MAIN FACTORY AND GENERAL OFFICES,
CONGRESS AND GREEN STREETS.



FACTORY NO. 2.



GENERAL WAREHOUSE.

The Kellogg Switchboard and Supply Company have just rented and equipped Factory No. 2 with 34,000 square feet of new floor space. This space, together with our main factory, is entirely devoted to switchboards and telephones. We have also increased our warehouse capacity to 35,000 square feet, and have filled same with a complete stock of our standard make of telephones. Our entire plant equipped throughout with modern machinery and manned by the most expert mechanics affords unexcelled facilities for the manufacture of the highest grade of telephone apparatus.

Our increased factory capacity enables us to make everything not in stock at very short notice. We are prepared to fill from stock all orders for telephones of standard types. Orders for magneto or common battery switchboards will be filled with unusual despatch.

We manufacture no inferior grades. Our apparatus as to quality, durability and beauty will be strictly maintained. Write for prices.

**KELLOGG SWITCHBOARD and SUPPLY COMPANY,
CHICAGO**

346 Broadway
New York

Electric Building
Cleveland

Keystone Telephone Building
Philadelphia



MONARCH COMPACT TYPE TELEPHONES

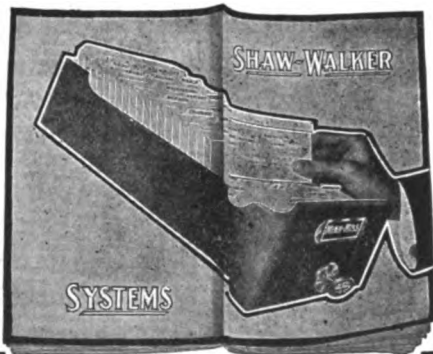
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

All the big Companies
use them!

ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.

MAGNET STEEL

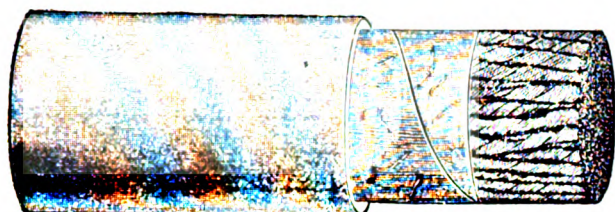
Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND

A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

TELEPHONE CABLES PAPER OR RUBBER INSULATED



BEFORE BUYING YOUR CABLE OR TELEPHONE SUPPLIES SEND US YOUR SPECIFICATIONS FOR OUR PRICES

THE W. G. NAGEL ELECTRIC COMPANY
416 HURON STREET, TOLEDO, OHIO

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Electric Appliance Co..... 3	Klein, Mathias, & Sons..... 33	Roebbling's, John A., Sons Co.... 11
American Electric Telph. Co.... 40	Elkin Machine Co..... 33	Leslie, A. C., & Co..... 8	Sand Point Cedar Co..... 30
Am. School of Correspondence... —	Ericsson Telephone Co..... 10	Lindsley Brothers Co..... 30	Scovill Mfg. Co..... 2
American Vitrifed Conduit Co... 39	Fahnestock Transmitter Co..... 33	McIntire, C., Co..... 36	Shaw-Walker Co..... 8
Automatic Electric Co..... 9	Field, C. J..... 36	Maltby Lumber Co..... 29	Standard Underground Cable Co. 12
Barr, W. J., Mfg. Co..... 12	Fowler, John H..... 32	Michigan Cedar Co..... 33	Stanton L. W..... 34
Beidler, Francis & Co..... 33	Franklin Mfg. Co..... 35	Middleton, J. W., & Co..... 34	Sterling, W. C., & Son..... 33
Bissell Co., The F..... 6	Franklin Rolling Mill & Fdy. Co.. 31	Miller Anchor Co..... —	Sterling Electric Co..... 6
Butterfield, J. F..... 34	Gest, G. M..... 38	Monarch Telephone Mfg. Co..... 8	Stromberg-Carlson Telephone Mfg. Co. 4
Camp, The H. B. Co..... 39	Hemingray Glass Co..... —	Morse Cedar Co..... 33	Swedish-American Tel. Co..... 12
Central Mfg. Co..... —	Holtzer-Cabot Electric Co..... —	Nagel, W. G., Electric Co..... 9	Telephone Printing Co..... 33
Central Telephone & Electric Co.. —	Huebel, C. J., & Co..... 29	National Wire Corporation..... 11	Townsend Cedar & Supply Co.... 32
Chicago Writing Machine Co..... —	Hyde, W. H., & Co..... 34	New Haven Novelty Machine Co. 2	Valentine Clark Co..... 30
Cohn & Bock..... 33	Imperial Finance & Cons. Co.... 34	North Electric Co..... 5	Vought-Berger Co..... 5
Columbia Electric Co..... 12	Ingram-Richardson Mfg. Co..... 8	Nungesser Electric Battery Co.... 10	Wanted, Situations, etc..... 80
Connecticut Telph. & Electric Co. 6	Index of the Technical Press..... 30	Okonite Company..... 34	Weston Electrical Instrument Co. 34
Cook, Frank B..... —	Inland Steel Co..... 32	Pacific Coast Pole Co..... 30	Williams-Abbott Electric Co..... 3
Couch, S. H. Co..... 5	International Telephone Mfg. Co. 5	Pignolet, L. M..... 35	Wisconsin Timber & Land Co.... 33
Crumb, W. H. Co..... 34	Kellogg Switchboard & Supply Co. 7, 32	Pittsburg & Lake Superior Iron Co. 29	Worcester, C. H., Co..... 29
Cunningham Iron Co..... 36	Bissell Co., The F., Toledo, O.	Pittsburg Sewer Pipe & Conduit Co. 36	Yesbera Mfg. Co..... 11
Dickey Clay Mfg. Co., W. S..... 36	Kellogg Switchboard & Supply Co., Chicago, Ill.	CABLE SLEEVES.	Cunningham Iron Co., Boston, Mass.
Eccleston Lumber Co..... 33	Nagel, W. G., Electric Co., Toledo, O.	Nagel, W. G., Electric Co., Toledo, O.	Field, C. J., New York.
BATTERIES.	National Wire Corporation, New Haven, Conn.	New Haven Novelty Machine Co., New Haven, Conn.	Gest, G. M., Cincinnati, O.
Electric Appliance Co., Chicago, Ill.	Okonite Co., New York.	CARD INDEX SYSTEMS.	Nagel, W. G., Electric Co., Toledo, O.
Mungesser Electric Battery Co., Cleveland, O.	Roebbling's Sons Co., John A., Trenton, N. J.	Shaw-Walker Co., Muskegon, Mich.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Standard Underground Cable Co., Pittsburg, Pa.	CLIMBERS.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
BONDS.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Klein & Sons, Mathias, Chicago, Ill.	CONNECTORS.
J. W. Middleton & Co., Chicago, Ill.	CABLE HANGERS.	Nagel, W. G., Electric Co., Toledo, O.	Cook, Frank B., Chicago, Ill.
BRASS.	Bissell Co., The F., Toledo, O.	CONDUITS.	McIntire Co., C., Newark, N. J.
Scovill Mfg. Co., Chicago, Ill.	Cook, Frank B., Chicago, Ill.	American Conduit Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.
BOOTHES.	Nagel, W. G., Electric Co., Toledo, O.	American Vitrifed Conduit Co., New York.	CONSTRUCTION SUPPLIES.
Yesbera Mfg. Co., Toledo, O.	Standard Underground Cable Co., Pittsburg, Pa.	Camp Co., The H. B. New York.	American Electric Tel. Co., Chicago, Ill.
CABLES.			Electric Appliance Co., Chicago, Ill.
American Electric Tel. Co., Chicago, Ill.			Franklin Mfg. Co., Syracuse, N.Y.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 80.

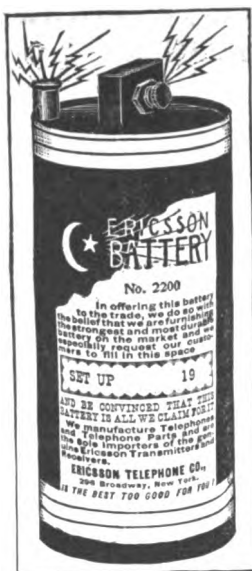
ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



If you don't give your subscribers
AUTOMATIC TELEPHONE SERVICE you
 don't give them the best.

Write for our catalogue.

Automatic Electric Company, Chicago, U. S. A.



Durable and Strong

Ericsson Dry Batteries last longer, are stronger, give better results and are cheaper than those of other makes.

Special Price in Barrel Lots.

Ericsson Telephone Co.

(INDEPENDENT)

MANUFACTURERS OF

Telephones, Telephone Supplies and Switch Boards FOR MAGNETO OR COMMON BATTERY

296 BROADWAY . . . NEW YORK, N. Y.

ADVERTISERS' DIRECTORY—Continued.

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>CONSTRUCTION TOOLS.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>COPPER.
Scovill Mfg. Co., Chicago, Ill.</p> <p>CORPORATION RECORD BOOKS.
Middleton & Co., J. W., Chicago, Ill.</p> <p>CORRESPONDENCE SCHOOL.
American School of Correspondence Chicago, Ill.</p> <p>CROSS ARM BRACES.
Inland Steel Co., Chicago, Ill.</p> | <p>CROSS ARMS.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.</p> <p>ENGINEERS AND CONTRACTORS.
Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.</p> <p>FILES.
Shaw-Walker Co., Muskegon, Mich.</p> <p>FUSES.
Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.</p> <p>GERMAN SILVER.
Scovill Mfg. Co., Chicago, Ill.</p> <p>GUY ANCHORS.
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.</p> <p>INSULATING MATERIAL.
Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburgh, Pa.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

CONTINUED ON PAGE 36.

It is not necessary to prove that the 1900 DRY BATTERY



IS THE BEST WE ADMIT IT

This Battery is carried in stock by all supply houses throughout the entire United States, Europe, Asia, Africa, Central and South America.

When you send your order to your dealer for Batteries, specify the

“1900”

The manufacturers stand behind the quality of the goods.

THE NUNDESSER ELECTRIC BATTERY COMPANY



Kiln Dried Booths

are the lasting kind. All wood is superseasoned. There is no cracking; therefore they're sound-proof. And with it all we **CHARGE LESS THAN ANY OTHER HOUSE.** Try us in price.

YESBERA MFG. CO.,
TOLEDO, OHIO.

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work
Wire Rope and Wire Strand
IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Insulated
Electrical
Wires and Cables

R O E B L I N G

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

TURN OVER A NEW LEAF.

1904 RING OUT THE OLD-RING IN THE NEW

MAKE A RESOLUTION TO USE SWEDISH-AMERICAN APPARATUS AND YOUR "TROUBLES" WILL VANISH.

SWEDISH-AMERICAN TELEPHONE COMPANY
CHICAGO



A Business Proposition

Our manufacturing expenses are low, and we are willing to give our customers the benefit:

The opposite cut shows our self-restoring drop, self contained and fully guaranteed. The simplest and most reliable drop on the market.

SAMPLE BY MAIL \$1.25

We make everything in the telephone and switchboard line, and will retail at factory prices.

Our catalogue, and net price list is free for the asking.

COLUMBIA ELECTRIC CO.
Factory, McCORDSVILLE, IND.

Mention this paper.


WE HELP TO MAKE



A Good Telephone

ADDRESS "BARRARM," CLEVELAND

Telephone Wire and Cables



BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,
PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JANUARY 30, 1904

NUMBER 5

AUSTRIAN TELEPHONIC METHODS

BY CARL V. WISMAN.

TELEPHONE service, as offered in Austria, presents several features which appear novel and almost strange to the American eye, but, nevertheless, contain many which, with more or less modification, may be adopted, under circumstances, in this country to advantage. The history of the Austrian service dates from 1880. Some of the municipal regulations under which the telephone company was subjected were carried to the extreme. For example: In Cracow, the telephone company was compelled to run all wires horizontally, immediately beneath the eaves of all houses and at the same height above the ground. As unfortunately, the houses were of different altitudes, the telephone company was non-plussed, and, for many years, Cracow lacked telephone service. Early in the 90's, the State commenced to absorb all of the telephone companies and, at present, completely possesses all of its service which is operated under government control. The last company to be absorbed was that operating in Vienna, and which is accredited with possessing the best telephone service in the world. Unconfirmed rumor states that nearly 30,000 subscribers have been there operated from a single board. It is, therefore, fair to state that the Vienna board is built upon the plan of a divided multiple. The first installation, which has since been considerably extended, consisted of three boards installed up-

on three separate floors. There were two boards of three thousand lines each and one of twenty-four hundred lines which were designed by Otto Shaffler of Vienna, and manufactured in that city. Our illustration shows one of the three thousand line boards. Between each board a set of local trunks extended and any call which could not be answered in the multiple, upon the operator receiving it, was trunked to either of the other boards upon which the desired subscriber was located. Such a method of operating is little different from that involved where exchanges are located in different buildings widely separated.

The method of charging for Austrian service may throw some light upon the adoption of this design. The plan adopted is to require the subscriber to pay a sufficient sum to cover the installation of his line at the time when he applies for telephone service. This payment is called a contribution and amounts to

\$20.00 for lines not exceeding one-third of a mile. For every six hundred feet additional, the charge is increased by four dollars. An equal charge, namely \$20.00 per annum, is made for giving service, so that when a subscriber applies for a telephone, he must pay the first year \$20.00 for installation, and \$20.00 for service, a total of \$40.00. For the second and succeeding years the charge is but \$20.00. If, however, the subscriber desires the so-called contribution, charge may be distributed for five years, or, in other words, he may pay an annual rental of \$24.00 for five years and \$20.00 for each succeeding year.

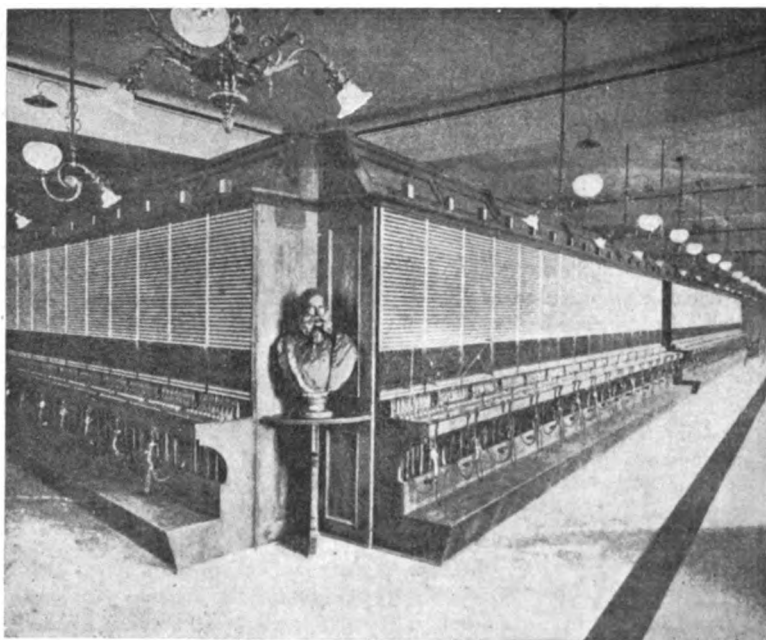
From the standpoint of the company this plan possesses the advantage that it requires very much less initial capital to start a telephone company because only that which is needed for the

switchboard must be raised as each subscriber pays for his line as fast as it is installed. Nor in a sense, does this seem a hardship if applied to the subscriber, for he becomes, as it were, a kind of partial owner in the telephone company and, as in general, subscribers are held responsible for all damage that results to their instruments, there is a strong tendency to make the subscriber much more careful than under a management which assumes all risks.

In America the cost of removing telephones when the subscriber changes his location, is borne by the telephone company, but in

Austria this expense must be assumed by the subscriber, so that when a line is given up it is necessary to pay the cost of removing the instrument and such other line extensions as may be required to furnish a circuit in the new location. The State has found it advantageous to offer many facilities for mutual telegraphy and telephony. Thus a telegram arriving for any subscriber, may be sent to the central station and telegraphed at once to the subscriber. If he desires a written confirmation of the message, the same will be done, provided the necessary stamps for mailing the written copy, together with a small fee for transmission accompany the telegram. Any subscriber wishing to send a telegram, may call up the office, deliver his message to the operator and have it telegraphed forthwith.

A remarkably efficient message service has been established in conjunction with this combined service, so that parties who are



A Three Thousand Line Board in the Telephone Exchange at Vienna.

not subscribers can be called to the central office to receive a telephone message, or if telegrams, which have been provisionally telephoned, delivered to them. The rates for this service are certainly attractive from the American standpoint. Two cents a word is charged for every message which is transmitted in this manner. This is in addition to the regular operating tariff of \$20.00.

The toll system throughout Austria is equally complete, and the rates correspondingly low. All toll line messages are

based upon a three minute allowance, and the rate from Vienna to Berlin is sixty-two cents; from Vienna to Budapest and for Hungarian towns, thirty-five cents; to Bavaria, Wurtemberg and Switzerland, twenty-five cents.

It is probably true that, taken as a whole, European service has by no means reached the point of excellency established in America, nevertheless, of the details and demonstrations there are many varying hints which operating companies in America would do well to hold.

CONVENTION OF NEBRASKA INDEPENDENTS' ASSOCIATION

By W. J. STADELMAN.

THE Fourth Annual Convention of the Independent Telephone Companies of the State of Nebraska, was called to order on Monday, January 18th, 1904, at the Lindell Hotel, Lincoln, Neb., by the President of the association, Mr. I. D. Clark, of Papillion, Nebraska. Mr. Clark gave quite an address expressing himself as well satisfied with the situation in the State and with the work that the State association had accomplished since its organization. He made a strong plea for the closer alliance of the Independent companies and explained why they should stick closely together, that they might cope with the opposition. He said: "If we drift apart and fight each other we cannot expect success; success must have strength, and our strength is in the consolidation of our forces."

Mr. Clark also dwelt on the necessity of toll lines and the manner of their construction, also advising the establishing of a clearing house. After this address Mr. E. C. Hansen gave his report as secretary of the State association, which showed that there are at present one hundred and ninety-two companies operating. The attendance at the last convention was only forty, while at the opening session of this meeting over sixty had reported and several more were to arrive on the later trains. At the rate of increase of the Independent business in the State for the past year, the predictions at the Chicago Convention that Nebraska would be the banner telephone State in the Union the coming year, was well founded. In conclusion Mr. Hansen expressed himself as heartily in favor of the toll line propositions and stated that we are growing or have grown to such proportions that the various companies now demanded long distance connections. Mr. Hansen also expressed himself as in favor of a clearing house to pass on the conditions of the different telephone companies' stocks and bonds; he claimed that there were many good companies in the State with stocks and bonds for sale, also that there is plenty of local money looking for good investment, but that the moneyed men are unable to get correct reports of these companies.

After Mr. Hansen, a paper was read by Mr. J. E. Adamson, of Broken Bow, on "Selective Signalling on Party Lines." This brought out a lengthy discussion which did not terminate until a motion was made to inspect the exhibits of the telephone companies.

In an interview, Mr. Thomas Parmele, president of the Plattsmouth company, said: "The growth of Independent telephony has been a record-breaker since the inception of the movement. Five years ago the movement was an infant in the State, only five companies being engaged in the business of running Independent systems, and the mileage covered was less than a couple of hundred. There are now over three thousand miles and this is growing every week. Almost the whole of Nebraska is traversed at the present time by Independent lines. The important question now up for the grave consideration of the Independent men, is the one of the extension of toll lines. The Independent corporations have reached the point where the matter of long distance communications must be acted upon, and I think that the present session will handle the question and come to an agreement that will not only be satisfactory to the

Independents but to the public as well. Indicative of this movement the Plattsmouth company has contracted with the Lincoln company to connect its toll lines as soon as the latter is ready for business.

Several Independent men were seen and they stated that they were greatly satisfied and interested in the extension of the toll system and would favor any move that would advance the interests of the subscribers.

The Monday evening session was called to order by the president, and a vote taken showed that 70 were in attendance. A. N. Munn, of Nebraska City, spoke on the subject, "Toll Line Standards and Toll Line Construction." J. H. Minninnick, of Lincoln, followed on the same subject; after this there was a general discussion on the subject which took up the early part of the session. A resolution was offered by Mr. Munn providing for the formation of a clearing house for the distribution of proportional rates.

Mr. Munn introduced another resolution empowering the toll line committee to employ a competent person to inspect toll lines and report deficiencies, the committee to be authorized to buy and install proper equipment, the cost to be met by the companies benefited. On motion the president was empowered to appoint a toll line committee. He named Messrs. Pollock, of Plattsmouth; Munn, of Nebraska City; Crist, of Columbus; Ewing, of Lincoln; Killarney, of Auburn; Bell, of York; Grant, of Falls City; the president, vice-president and secretary to be members ex-officio. The meeting then adjourned to attend a banquet given in the rooms of the Commercial Club by the manufacturing companies and the Lincoln Telephone company.

The Tuesday morning session was attended by most of the members, who came early so as to accept the invitation extended by the Lincoln Telephone company to inspect its plant, and so they might have their pictures taken in front of the Exchange Building. At 10:30 the morning session was called to order, and after a lively discussion of the work so far accomplished, the officers for the ensuing year were elected.

I. D. Clark, of Papillion, president.

J. E. Adamson, Broken Bow, vice-president.

E. C. Hansen, Fairbury, secretary and treasurer.

W. H. Doubendick, of Dewitt, read a paper on the character of farm line construction and the proper rates to be charged for the farmer party lines. After the subject was thoroughly discussed, a motion was made to adjourn for dinner. The afternoon session opened by E. A. Gant, of Falls City, reporting for the rate committee. The rate scale suggested is based on a mileage consideration, subject, of course, to local conditions. Where the Bell company makes a fight these rates may be reduced.

The rate basis is one half a cent per mile, about the same, or a trifle less, than the rates made by the Bell company. The report of the committee was ordered printed. W. J. Courtright, of Fremont, spoke on "The Legal Relations of Telephone Companies."

Mr. Courtright then offered the following resolution, which was adopted: "To the business men in Omaha and the Omaha Commercial Club. The Nebraska Association of Independent Telephone companies in annual session assembled send you

greeting, and call your attention to the following facts:

"That in the United States to-day the Independent telephones in actual use exceed the Bell telephones by more than fifty per cent. That Nebraska is just getting under headway in the movement. That the reasons the Independent companies can afford to give lower rates than the Bell companies are well established and indisputable facts. That in the smaller towns your better customers are using the Independent telephones almost exclusively.

"That in your competitive cities of Chicago, St. Paul, Minneapolis, Sioux City, Des Moines, Council Bluffs, Cedar Rapids, Lincoln, Fremont, Grand Island, Kearney, Beatrice, Nebraska City, Plattsmouth, Columbus, Topeka, St. Joe, Kansas City and many others, there are Independent systems now built or building. And these cities are rapidly being connected with toll lines with a thousand towns in your territory.

"That the Independent companies are almost uniformly backed by home capital and influence and have reached proportions that have made them a power to be reckoned with in the business affairs of the State.

"If Omaha wishes the favors of these companies and their patrons, then Omaha must reciprocate with toll connections for the day has come when the merchant buys largely over the telephone.

"That we compliment Lincoln that she has taken time by the forelock in the matter."

The next meeting of the Association will be held in Omaha, time to be decided on later.

The following manufacturing companies were represented at the convention: The Stromberg Carlson Manufacturing Co., of Chicago & Rochester, had a very elaborate display and was represented by C. W. Bartlett. There was arranged in the center of the room a triangle-shaped framework, which supported their equipment; from this there was many small, various colored electric lights festooned. The Western Electrical Co., of Omaha, Neb., was represented by L. G. Lowery. The Vought-Berger Co., of La Crosse, Wis., occupied a suite of rooms and showed a large assortment of new and novel goods, which made a good display; the visitors were well looked after in this quarter, being entertained by music continuously. The ladies who visited were supplied with chrysanthemums; M. I. Berger, secretary and treasurer of the Vought-Berger Co., of Lacrosse, and Mr. G. F. Keifer, the Nebraska representative, were in charge.

The American Electric Fuse Company was represented by George W. Rohrmer.

New Haven Novelty Machine Co. were in the same quarters with Vought-Berger & Co.

The Chicago Telephone Supply Co., of Elkhart, Ind., had a large and well arranged display handled by their representative, Mr. Brown. Mr. G. A. Briggs was also on hand and spoke very flatteringly of the Nebraska convention. He has sold Rulo, Deshler, Hune, Lawrence and Filey, exchanges since the first of the year.

The American Electric Telephone Company, represented by Mr. S. J. Bear, of Topeka, Kansas, had a large and interesting exhibit, showing many new features to the western trade.

Ericsson Telephone Co., of 296 Broadway, New York, occupied a suite of rooms and had an excellent exhibit, which was well handled by Mr. C. M. McNeill, of Beatrice, Nebraska.

The International Telephone Manufacturing Co., of Chicago, was represented by Thomas G. Seymour.

The Illinois Electric Company was represented by Malcolm McNeill, Jr.

The Electric Appliance Co., of Chicago, was represented by Mr. Bly, who made friends by touching the westerners in the right place—he gave a dinner.

List of some of the members in attendance:

H. H. Herndon, Ashland.
O. M. Thorp, Golden Rod Telephone Co., Wahoo.
T. H. Pollock, Plattsmouth.
W. H. Herst, Golden Rod Co., Stromberg.
H. B. Woodline, Auburn.
H. F. Cannon Home Telephone Co., Cook.
W. S. Jackson, Cherry County Telephone Co., Valentine.
I. D. Clark, Papillion.
Geo. F. Hewes, Lincoln Telephone Co., Lincoln.
T. E. Parmelee, Plattsmouth.
A. B. Maiben, Palmyra Telephone Co., Palmyra.
W. W. Campbell, Clay Center.
E. E. Evert, Platte County Telephone Co., Columbus.
A. J. Garlow, Platte County Telephone Co., Columbus.
A. S. Sands, Saline County Telephone Co., Wilbur.
James Howard Heine, Hooper.
M. W. Newton, College View Telephone Co., College View.
Frank E. Bell, Wayne.
A. R. Dockson, Valley.
C. Veil, Arlington.
Fred. Eckencamp, Valley.
M. C. Theisen, Camp Dewey Telephone Co., Creighton.
F. G. Bills, Lincoln.
Saline Telephone Co., Tobias.
B. R. Chapman, Anselmo Telephone Co., Milburn.
Fred J. Bell, Ord Independent Telephone Co., Ord.
H. W. Cutschall, Shelby, Ia.
J. H. Richey, Seward County Telephone Co., Beaver Crossing.
Henry Gake, Seward County Telephone Co., Beaver Crossing.
W. E. Bell, York Telephone Co., York.
A. E. Weakley, Valley.
W. E. Dorrington, Falls City Telephone Co., Falls City.
W. E. Taylor, Fullerton.
W. C. Ford, Home Telephone Co., Kearney.
Glen A. Stevens, Shelton.
Howard C. Washburn, Shelton.
A. B. Smith, Woodbine Telephone Co., Woodbine, Ia.
W. H. Daubernick, Diller.
Glen N. Venrich, DeWitt.
C. E. McClain, Weeping Water.
A. M. Munn, Nebraska City.
W. J. Stadelman, Home Telephone Co., Kearney.
T. H. Ewing, Lincoln.
W. J. Smith, Shelton.
E. C. Hansen, Fairbury.
F. W. Corrick, Cozad.
Mrs. Mamie Updike, Overton.
Dr. Boardman, Overton.
E. C. Krewson, Elm Creek.
Geo. Fields, North Platte.
I. D. McConnell, Callaway.
Geo. Bischell, Kearney.
Peter Wink, Kearney.
Bruce Brown, Kearney.
W. H. Anderson, Buda.
J. L. Hopper, Butler.
J. L. Adamson, Broken Bow.

SOME REMARKS ON INSTRUMENT SETTING

By B. C. WILHELM.

THE work done by the instrument setter consists of placing the telephone instrument in its proper position in the subscriber's premises, extending the line wiring from the line terminal to the telephone instrument, and setting up and connecting the transmitter batteries so that they will be in proper working order.

The work of extending the line wiring to the subscriber's building naturally separates itself into two divisions. One where the line terminal is aerial, and the other where the line terminal is

underground. Where the line terminal is aerial, the line construction may be either of the open wire or cable types. If the line construction is of the open wire type, the lines may be terminated by either dead ending on the insulators or by entrance into a cable-box. The method employed for dead ending wires on the insulators is shown in Fig. 1, where the pole is seen at A, the crossarm at B and the insulators at E C' C" C"', etc. It will be seen that the line wire is passed around the insulator, then through a McIntire sleeve D and the free end is allowed to

extend for a length of 3 inches and bent down at right angles to the line. In Fig. 2 is shown the method of terminating an open wire line in a cable-box. All the wires are dead ended in the same manner as that already shown. From the ends of the open wires the lines are carried in the conductors of a bridge cable, *BB*, which passes through cleats *D D' D''*, etc., down the side of the pole and into the cable box through a hole at its bottom. The cable is shown at *C*.

The cable box is shown at *A*. The roof of the box projects sufficiently in front and at the sides to prevent the rain from being blown in through the cracks, and slopes toward the back, so as to throw off water in that direction. The inside of the box is shown in Fig. 3. On either side are two strips of binding posts *A* and *A'* to which are attached the conductors of the bridge cable. At *B* and *B'*, *D* and *D'*, are four strips of maple, called cleats, with a sufficient number of holes bored in them (shown at *1, 2, 3*, etc.) to accommodate all the pairs that are to be terminated on the strip of binding posts.

Referring again to Fig. 2, it will be seen that the cable box is mounted upon the pole by first attaching to it two pieces of crossarm *F*, sufficiently long to project about 6 inches on either side. The box is then fastened in its place by means of two bolts, which extend through the box, crossarm and pole.

That portion of the wiring extending from the line terminal to the point of entrance into the subscriber's station is called the

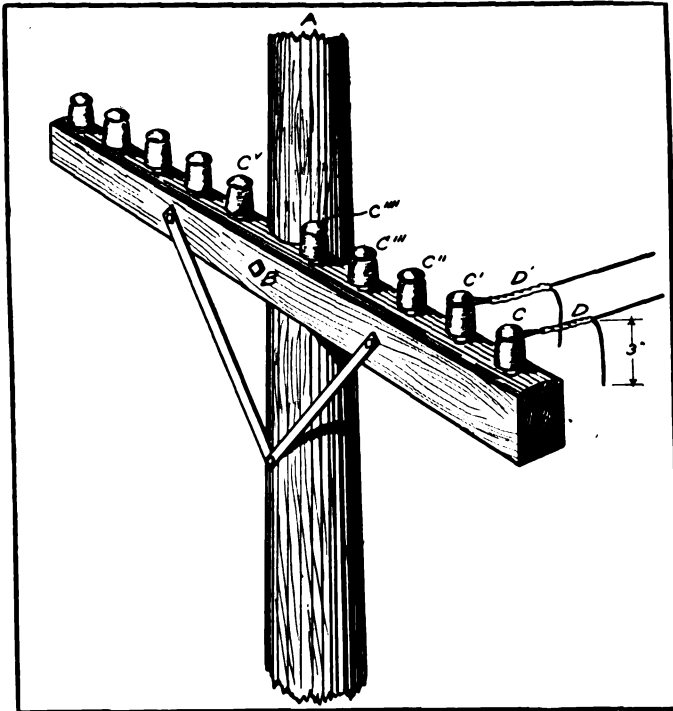


Figure 1.

drop wire. That portion extending from the exterior to the interior of the subscriber's station is called the *leading in wire*. That portion extending from the terminal of the leading in wire to the subscriber's telephone is called the *house wire*. For running the drop wire, No. 16 B. W. G. hard-drawn copper wire is best used. It is sufficiently strong to carry a load of anything under 200 pounds without breaking. It is coated with a layer of tin, to prevent corrosion, which might be caused by the rubber insulation that surrounds it. The insulation is protected by a heavy braid. Two conductors are twisted together to form a pair, and it is a usual thing to have the braid on one conductor of a heavier texture than that on the other, so that each conductor may be identified. In Fig. 4 is shown a piece of this twisted pair wire, the wire being shown at *A*, the rubber insulation at *B* and the braid at *C*. The length of the twist given to the two conductors is called the *lay*, and with this class of wire the lay has a length of from $4\frac{1}{2}$ to 5 inches.

Leading in wire is not always used. In fact its use is becoming less and less frequent. It is of No. 16 B. & S. gauge, soft-drawn copper wire, tinned, covered with a rubber insulation

and a protecting braid. Neither the braid nor the insulation are as thick as those used on the drop wire. It is not twisted into pairs.

House wire is No. 19 B. & S. gauge, soft-drawn, tinned copper wire, covered with a rubber insulation. The protecting braid is colored to imitate the various woods used in furnishing the interior of dwellings or offices, such as oak, mahogany, cherry, black

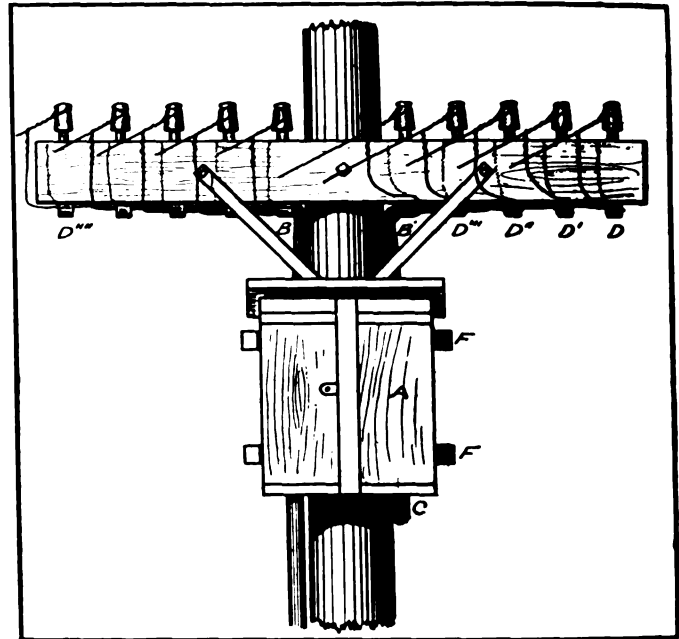


Figure 2.

walnut, etc. White braid may be used where the wire is to be attached to plastered ceilings or walls. Two conductors are twisted together to form a pair, and the braid of one is of a heavier thread than that of the other, for identification. In Fig. 5 will be seen a short piece of this wire. Its lay is about $2\frac{1}{2}$ inches.

TOOLS.—The tools needed by the instrument setter consist of a

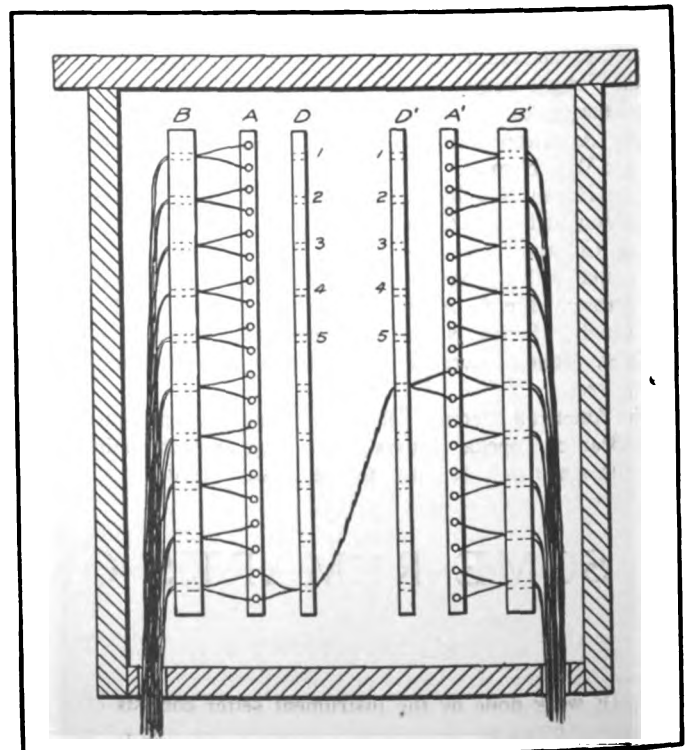


Figure 3.

pair of cutting pliers, one small screw driver, one large screw driver, a good brace with a set of bits, one extension bit, a hammer and a soldering torch. There are certain requisites which all good pliers must possess in order to be of service to the instrument setter. In length, the pliers need not exceed $5\frac{1}{2}$

or 6 inches, as this length is sufficient to give a firm grasp and yet not too great to make the tool unwieldy. Pliers longer than this are not only sure to be unnecessarily heavy, but are too large about the jaws to enable the instrument setter to handle them with the proper amount of dexterity. In Fig. 6 is shown a pair of side-cutting pliers of good design. In selecting pliers, care should be taken to see that when they are closed the cutting edges meet, while the jaws are separated by about 1/100-inch, or about the

Figure 7.

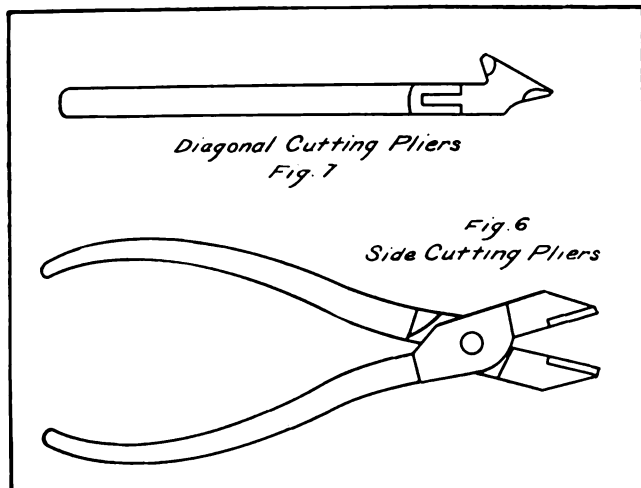


Figure 6.

thickness of a very fine lead pencil mark. If the jaws touch before the cutting edges do, the latter will be separated by a greater or less space and great inconvenience will result when trying to cut wire. When this condition exists the pliers are said to be *free*; and no good instrument setter ever uses pliers that are *free*. The instrument setter may find it convenient to carry an extra pair of larger pliers for use on the heavy line wire; but the

occasions on which these latter are used are so rare that carrying them hardly pays for the inconvenience caused by their extra weight.

Some instrument setters prefer to use what are known as

Figure 4.

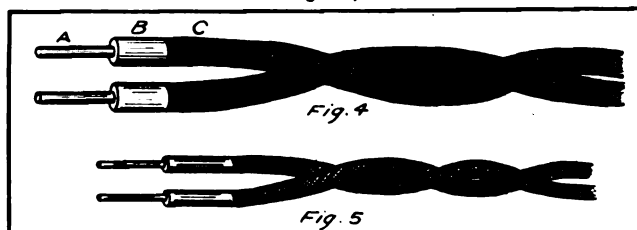


Figure 5.

diagonal cutters, such as are shown in side view in Fig. 7, where the cutting edge, *A*, as shown, is inclined to the plane of the pliers at an angle. The advantage gained by this form is that work can be done in small corners. They are very useful to the switch-board man, but are not essential to the instrument setter.

The screwdriver should be strongly made, and as light as possible, consistent with the strength. The handle should be sufficiently large to afford a firm grasp. A good type is that shown in Fig. 8, where the shank, cylindrical in shape, is shown at *B*, the edge at *A* and the handle at *C*. The edge should be sharpened

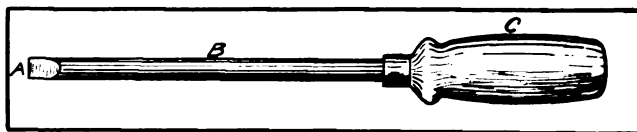


Figure 8.

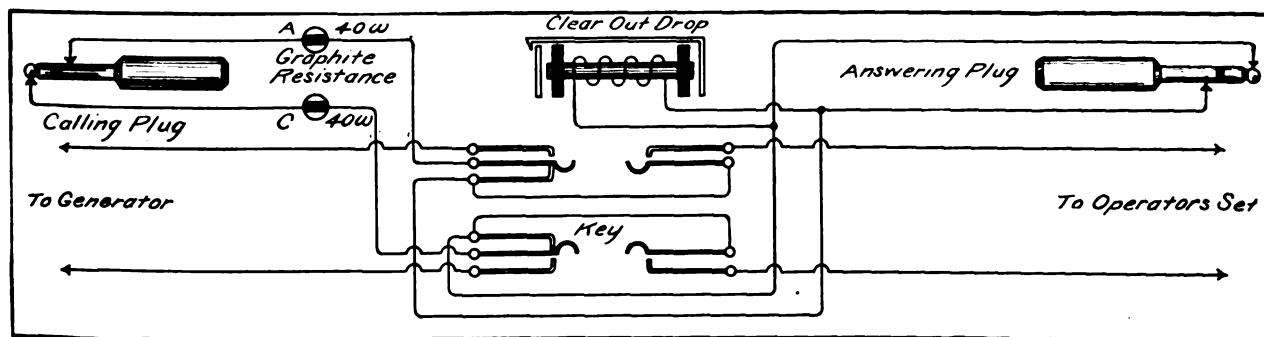
sufficiently to take a No. 8 screw. The length of the shank should be about 6 inches for general use. A larger one—about 10 or 12 inches in length, should also be carried for heavier work.

A GOOD CORD CIRCUIT SCHEME

BY GEORGE BERGH, Engineer, Helsingfors, Sweden, Telefonforening.

THERE may sometimes occur trouble with the disconnecting (clearing out) signals in a telephone exchange, when the called subscriber has closed (short-circuited) his apparatus, or if his line be crossed at any point. The figure shows a cord circuit diagram that is found to work well for preventing this trouble. Suppose a subscriber *A* wants to speak with another *B*,

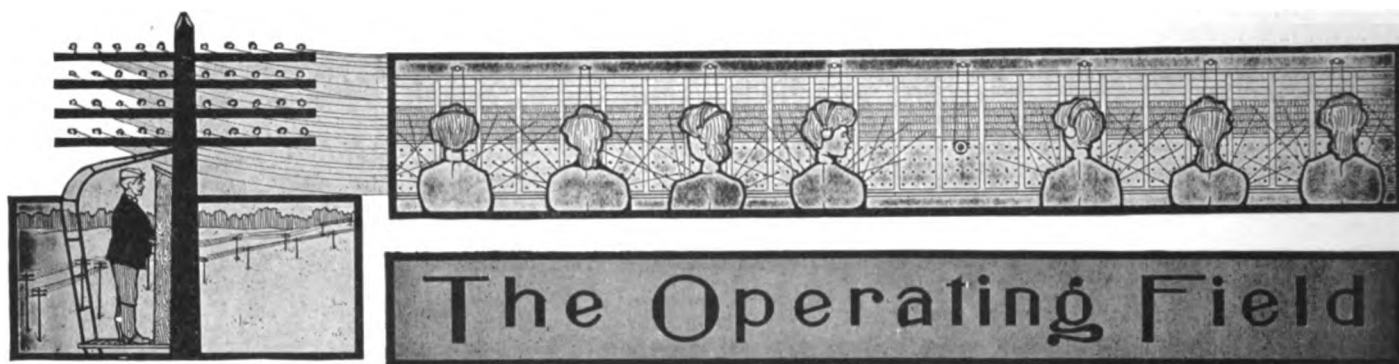
short circuit on the line, since its resistance is a few ohms only, while the ordinary path through the clear out relay or drop has generally from 600 to 2,000 ohms resistance, to say nothing of the impedance. The natural conclusion is that the clear out drop does not come down. A method of obtaining a sure disconnecting signal is to connect graphite resistances, of say, 40 ohms,



Showing the Insertion of Two Graphite Resistances in the Calling Side of the Cord Circuit, in Order That the Clearing Out Drop May Always Come Down Even When the Called Line is Short Circuited.

which line (or apparatus) may be short-circuited. He calls the station in the usual way and connection is made by the operator, but of course, he does not get any answer from *B*, on account of the short circuit. Difficulties will now be met with, for *A* will be unable to operate the clear out drop or relay in the exchange. Most of the current from his generator will flow through the

as shown in the figure, at *A* and *C*. Then there will always be a resistance of say, 80 ohms behind the drop or relay. It has been found that this resistance does not affect the transmission enough to be at all noticeable. Graphite, or some other non-inductive resistance is necessary, since it must offer no "apparent resistance" or impedance to the talking current.



"POSTMASTER PAYNE'S ORDER WON'T STAND."

LOCAL officials of the Independent telephone companies with headquarters in Cleveland, are firmly of the belief that the objectionable order of Postmaster-General Payne for the removal of all Independent telephones from post offices, will be rescinded. President F. S. Dickson, who has been the leader of the movement against the order, does not hesitate to assert that such will be the result. The telephones of the Cuyahoga Company in the Cleveland post office were to have been removed on January 31 according to the order, but President Dickson says that even if the order is not rescinded before that time, he is convinced that it will never be carried out. No word has as yet been received from President Roosevelt farther than an acknowledgment of the three letters sent him by Mr. Dickson, but the latter is sure that the pressure he has brought to bear will have the desired result.

The celerity with which President Dickson has acted in the matter is astonishing. Not only have the Independent lines throughout Ohio and neighboring States been stirred up from the Cleveland offices, but letters have been sent far and wide to Independents in all parts of the country, or "from Maine to Texas," as President Dickson expresses it. No less than half a dozen senators whose influence is great at Washington, are now interested in the fight.

"It is one of the greatest mistakes that Payne could have made," said President Dickson discussing the affair. "It's a thing that the people won't tolerate. I honestly believe that if it were to be made a political issue it would be of more consequence than the Panama canal controversy, for it is a thing that gets nearer to more people. It seems to me that there can be only one way out of it and that is by the rescinding of the order. It comes at a time when there can be no political chances taken, and the effect of such an order, if enforced, might easily be the deciding influence in swinging several doubtful States into the Democratic columns. All we want is fair play. I wouldn't think of asking that the Bell telephones be thrown out of the post offices and ours used in their place. That would be manifestly unfair. What we do want, though, is fair play and an open field. Such a fight as this against the Bell has been the easiest thing in the world. And yet, the whole thing was just such a Bell trick as one might expect."

POSTMASTER PAYNE'S ORDER IN W. VIRGINIA.

POSTMASTER GIBBENS, of Parkersburg, W. Va., has not yet received the order from the postmaster-general directing him to take the Independent telephone from the post-office, but is expecting it at any time. He has been in correspondence with the post-office department for over a year relative to this matter. It seems that the order is made mandatory only as a last resort to carry out the wishes of the department which have been repeatedly given to postmasters in less imperative terms for the last year. Mr. Gibbens has urged every possible reason why the local telephone company should not be discriminated against in Parkersburg. He has represented to the

heads of the department that the Bell telephone is not used once while the Independent telephone is used fifty times in Parkersburg. He has pointed out that in the two years since his appointment he has never had occasion to call up the department at Washington and never has been called up by it. And he has furnished indisputable facts to convince them that the interests of the patrons of Parkersburg office demand the retention of the West Virginia Western instrument. But these representations have made no impression upon his chief. The order is expected to require not only that the Bell be retained, but that the Independent telephone be taken out. The local company will not be permitted to keep it in, even if they desire to do so free of charge.

YORK STATE'S FIRST ANNUAL MEETING.

THE first annual meeting of the York State Telephone Company, of Elmira, N. Y., since its organization one year ago, was held at the company's office recently. The following directors were elected: T. B. Crary, Binghamton, N. Y.; S. L. Johns, McSherrytown, Pa.; E. M. McKee, Towanda, Pa.; C. L. Tracey, Towanda, Pa.; E. M. Leander, Shamokin, Pa.; W. A. P. Thompson, Coatesville, Pa.; Eugene Diven, Elmira, N. Y.; Boyd McDowell, Elmira, N. Y.; Ward R. Bliss, Chester, Pa.; Ellis L. Orvis, Bellefonte, Pa.; M. D. Detwiller, Harrisburg, Pa.; E. S. Reinhold, Mahoney City, Pa.; C. M. Clement, Sunbury, Pa.; G. R. VanAlen, Northumberland, Pa.; U. M. Fell, Towanda, Pa.; H. N. Gitt, Hanover, Pa.; H. C. Mandeville, Elmira, N. Y.; W. D. Barnard, Philadelphia, Pa.; Edward Davis, Philadelphia, Pa.; E. M. Yarnall, Philadelphia, Pa.

The board afterwards elected the following officers: President, W. D. Barnard; vice-president, Edward Davis; secretary and treasurer, Robert M. Dougal; general superintendent, George B. Wright. The report of Vice-President Davis to the stockholders showed that the company had increased the number of telephones from 2,461 at this time last year, to 3,617 at present, a growth of 50 per cent. in one year; that long distance connections had been made during the year with the following points: Watkins, Corning, Addison, Hornellsville, Olean, Bradford, Salamanca, Jamestown, Dunkirk, Buffalo, Niagara Falls, Rochester, Canandaigua, Geneva and other points north and west, also Waverly, Sayre, Athens, Towanda, Scranton, Wilkesbarre, and other points south. The connection with Scranton accomplished, opens up to the York State Company and its lines through connection with 50,000 Independent telephones in eastern and central Pennsylvania, and 3,000 miles of toll lines in the States of Pennsylvania, New Jersey, Maryland and Virginia, which will give its patrons service to all important business centers in that territory, viz.: Scranton, Wilkesbarre, Pittston, Pottsville, Lancaster, Harrisburg, Allentown, Philadelphia, Reading, Altoona, Trenton, N. J., Baltimore, Md., and intermediate points.

From Binghamton the company has long distance connections with Cortland, Syracuse, Rome, Watertown, Oswego, Utica, Little Falls, Amsterdam, Troy, Albany, Schenectady, Saratoga and Glens Falls, and points in Vermont. As soon as this connection is made the service will be quite comprehensive throughout

the State of New York. With this connection made over 60,000 telephones can be reached in New York State over lines or Independent companies. When it is realized that all this work has been accomplished within the past three years, and that the growth of Independent telephones is more rapid at the present time than ever before, some idea of the magnitude of this work can be obtained.

COLONIAL COMPANY'S ANNUAL MEETING.

THE annual meeting of the Colonial Telephone Co., of Newburgh, N. Y., was held recently, a majority of the stockholders being represented. The report of the superintendent, George G. Otis, was presented. It showed the gain of telephones used on the system the last year has been greater in percentage than in any single year heretofore. With 419 in use on the close of last report, there have been 164 added and 55 disconnected, showing a gain of 109 instruments, and bringing the number in use on the system to 528. This was at the close of business on December 31, 1903. Mr. Otis reported the new business already done with orders to fill in the immediate future would bring the total up to 543. Mr. Otis said it would not be long until it would be necessary to install a new switchboard.

The election of directors resulted: Samuel V. Schoonmaker, Wm. George Taggart, Harry A. Bartlett, Hiram B. Odell, George G. Otis, F. William Wenzel, Wm. H. Coldwell, Chas. D. Robinson, of Newburgh; J. Lawson, of New York. Subsequently the officers were elected as follows:

President—Samuel V. Schoonmaker.

Vice-President—William George Taggart.

Treasurer—Harry Bartlett.

Secretary and General Manager—George G. Otis.

AN EXTENSIVE FARMER LINE PROJECT.

A PROJECT is on foot to make Greenville, Pa., the center of a radiating line of rural telephones. With free mail delivery the farmers in that section, who are of the most intelligent and progressive class, are looking toward the securing of other modern improvements. Some time ago a telephone line from Sheakleyville to Greenville was proposed and the promoter of it has been so successful that a meeting was held in Alliance hall, Salem township, to discuss the question. It is proposed to make the company co-operative, each subscriber being a stockholder. The meeting in Salem township was addressed by John Kamerer, district superintendent of the Union Telephone Company, and by C. W. Hunt, of Cleveland, a manufacturer of telephones. An organization was effected, Humphrey Orr was chosen president and T. L. Phillips secretary. A committee of five was appointed to secure subscriptions and right of way. Another meeting will be held. M. C. Brown, of West Salem township, is working in the interests of a similar line in his township, where it is said 125 farmers have agreed to subscribe. The lines will connect with the Union (Mercer county) Central at Greenville.

OHIO INDEPENDENT CONVENTION.

THE Ohio Independent Telephone Association will meet in Cincinnati, Ohio, Wednesday, Thursday and Friday, February 17-18-19, 1904, at the Grand Hotel, to which all Independents are most cordially invited. Independent telephone companies of Kentucky and Indiana have been invited, and from present indications the attendance will be very close to two hundred active, hustling telephone men. Cincinnati, Ohio, has no Independent exchange, and does not know of the magnitude of the movement, hence the desire to have the meeting there and making it a record-breaker to show the people of that city who the Independents are. Special rates on all railroads will be given.

The papers that will be read before the convention are all on live subjects, and prepared by men thoroughly posted. Serious and living questions of great importance to all in the Independent field will be discussed, and you will go home more able to cope with the enemy than before. The program is as follows:

Wednesday, Feb. 17, 9 A. M. to 3 P. M.—Registration and entertainment of delegates, secretary's headquarters.

Thursday, Feb. 18, 10 A. M.—Reading of papers and discussions; 1 to 4 P. M., examination of exhibits; 8 P. M., the time honored banquet will be dispensed with and a new and novel entertainment given for which no charge will be made.

Friday, Feb. 19, 10 A. M.—Reading papers and discussions; 1 P. M., election of officers.

INFORMATION REGARDING SWITCHING RATES WANTED.

THE following letter has been received at this office, and we would like to hear from those who know something about the question of rates. We would be pleased to publish any letters which wholly or partially answer our inquirer's queries.

I would like to get some information through your valuable paper concerning switching arrangements throughout the State of Indiana. I know there are a number of lines running into the country from the many city and town exchanges, and I want to get some idea as to what would be a fair price per telephone for such switching service. I want to find what each company that does any line switching for others charges per telephone or line, and what exchange they give them for the price charged.

It is trusted that all who are familiar with charges for this service will come to the aid of their brother manager.

ILLINOIS TELEPHONE & TELEGRAPH CO. CHANGES ITS NAME.

THE Illinois Telephone and Telegraph Company of Chicago, has filed for record with the county recorder a bill of sale for all property, including tunnels, tracks, telephone cables and automatic switchboard appliances and telephone system. The bill of sale runs to the Illinois Tunnel Company, an Illinois corporation recently chartered, with an authorized capital of \$30,000,000 and the power to issue as much more in bonds. Accompanying the bill of sale there was also filed for record a trust deed for \$30,000,000 on the assets of the new corporation to secure a bond issue. The previous mortgage on the conduits and other property of the Illinois Telephone and Telegraph Company, was cancelled, indicating that the old bonds have been taken up and new bonds issued in their place. The Equitable Trust Company is named as trustee.

CANADIAN INDEPENDENT EXCHANGES ENLARGED.

THE two Independent telephone exchanges installed by the towns of Port Arthur and Fort William, Canada, a little over a year ago for public service in opposition to the Canadian Bell Company, are proving a remarkable success which is clearly shown in the fact that each town has been required to add an additional section to their central office equipment to meet the demands, making their present equipment double the original installation and practically four times as many subscribers as the highest number that the Bell company had in service at any time. The Bell company has in service the generator-call system with solid-back transmitters on their principal business instruments and Blake transmitters on their residence telephones, while the municipalities are using throughout strictly long distance instruments with the latest improved "International" lamp signal central energy double supervisory switchboard system.

MEADVILLE COMPANY RECEIVES.

THE Meadville, Pa., Telephone Company gave a reception to its patrons recently that they might inspect the new system lately installed. The company was organized a little over four years ago, and the list of subscribers has grown to such an extent that the old-time service had to be discarded in order that the patrons might be properly served. The company began business with about 400 subscribers, and this has now grown to over 1,200. Hundreds of patrons called at the company offices on the day of the reception and were shown over the plant. Refreshments were served during the day.



ANOTHER INTERESTING ITEM.

IT sometimes happens that one finds truth in unexpected places. THE AMERICAN TELEPHONE JOURNAL never expected to discover anything true emanating from the Boston News Bureau. Boston News Bureau! It has an innocent, almost classic sound. The mere mention of the name brings up to the uninitiated visions of trustworthy statistics without end, newsy paragraphs, fairly bristling with truth.

But the Independent operators of the country are not among the uninitiated. They have reason enough to be thoroughly alive to the character of this hoary-headed, bewhiskered sinner known as the Boston News Bureau. For, from this source, the mouth piece of the American Bell Telephone Company, has poured the great volume of lies and deceptions concerning the Independent telephone industry which has flooded the country during the past few years. This fact makes all the more significant the following statement which, coming from such a source, at least approximates the truth:

"The Boston News Bureau has this from a telephone official: 'I believe the result of President Fish's recent visit to the West will be an active campaign during the coming spring against the Independents in the middle West, with a view of preventing their increasing their hold upon the city of Chicago, the desired haven. The battle will take place in the territory of the Central Union Company in the middle West, where competition is the hottest, and the field that Gen. Sabin, of San Francisco, attempted to conquer. It will have to be done by funds furnished direct by the American Company, as the Central Union Company is already up to its bond limit, and, notwithstanding that its stock has been cut in two, the market value is far below one hundred.'"

Everyone at all familiar with the telephone situation has known that the Central Union Company was in a bad way, as to both its physical and financial condition. But a new light is shed on the field of Independent telephony to have this condition so unblushingly acknowledged by this Bell bureau of misinformation.

Let us scrutinize these facts, find out their significance and discover if there is any lesson to be gleaned therefrom for the profit of the Independent operators. In brief then, the affairs of the Central Union Company are at such a low ebb that the parent company must come to the rescue with its ill gotten gold to save the remnants of this once profitable field of endeavor. Lines must be rebuilt, modern equipment must be installed, a campaign of education or rather, misrepresentation, must be entered upon, to save all that is possible from the wreck. And this will have "to be done from the funds furnished direct by the American company as the Central Union company is already up to its bond limit and *notwithstanding its stock has been cut in two*, the market value is far below one hundred."

This is truly a deplorable state of affairs. There must be something vitally wrong with a once prosperous business whose stock is worth far less than par after having been cut in two, and whose treasury is in a bankrupt condition. One need not go far to seek the cause of this degeneration. The cause in brief is Independent telephony. The Central Union company with all its prestige and the backing of the Bell monopoly has not been able to stand up against Independent competition. It certainly is time for the parent company to come to the rescue of its illegitimate offspring. For, if all this has resulted from disorganized competition what may be expected from the organized

WHAT ORGANIZATION WILL DO?

competition of the future? The Independent operators are getting together. They are forming alliances, offensive and defensive. Only a few days ago at Jacksonville, thirteen of the

Independent companies of central Illinois formed such an association, an indication of what is going on throughout the field.

But the real significance of this to the Independent operators who have made so brave and successful a fight against the Bell monopoly, is not that there is money in a well conducted telephone business, important though that is. The real significance, it seems to THE AMERICAN TELEPHONE JOURNAL, lies in the fact that aggressive and harmonious action on the part of Independent telephone companies has brought the Central Union Company almost to a state of bankruptcy. For it demonstrates the power they have within themselves when moving systematically along the same lines.

For instance, here is a concern known as the Kellogg Switchboard and Supply Company asking for Independent business, although it is absolutely owned by the Bell people and is controlled solely in their interest. That such a manufacturing concern is a constant menace to Independent telephony is recognized by all who have given the matter the thought which its importance deserves. Yet, how easy it could be wiped out of existence, sent the way of many other Bell auxiliaries which have bumped up against these hard Independent facts. If an unorganized competition could reduce the great Central Union Company to its present extremity, where it admittedly has not the funds to equip its lines so as to get upon a competitive basis, what would not an organized competition accomplish against this Bell manufacturing concern that is masquerading as an Independent?

There is no magic in the word Bell. Bell companies are amenable to the same laws of economies that govern the Independents. They will not long live without business. If the Kellogg concern fails to get sufficient business, it will soon be in worse shape than the Central Union Company. It can not get this business without the patronage of the Independent companies. Let the Independent operators conduct a systematic campaign of extermination against this Bell auxiliary. To do this it will only be necessary to withhold all patronage, to have absolutely no dealings with a Bell concern, under whatever name it may be conducted. Against such a campaign the Kellogg Company could not endure a year.

A TYPEWRITER TELEPHONE SYSTEM.

THE following, taken from a New York daily newspaper, is interesting. We refuse to vouch for its truthfulness:

"The typewriter telephone system, which a few months ago was only an inventor's dream, is now a fact in Berlin, Germany. It has been in operation for ten weeks and has 68,000 subscribers. With the new system, the telephone is no longer a nuisance to busy people. The noisy bell can be silenced. The sender of the message writes it on a typewriter at one end of the line, and an automatic typewriter receives and writes the message at the other end of the line. If a business man should be absent from his office for a day, or even for a week, he would find every message that had been sent to him. It is being used mainly by men who wish to receive business reports from different offices."

THE TELEPHONE IN THE COURTS

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

LICENSE, NOT VESTED RIGHT.

DOES not the permission of the county officers coupled with ten years' occupation give a telephone company an interest in the soil of a highway so that they could not be required to move for any reason whatever? This inquiry is suggested by your answer in the issue of Dec. 19 headed "Road Commissioners May Regulate." J. M. M.

YOUR right in the soil would be merely a license revocable at the will of the municipal authorities and give you no vested interest in the soil. *Readfield Teleph. & Tel. Co. vs. Cye (Me.)*, 49 A. 1047.

RIGHTS OF SUBSCRIBERS TO EXTENSION INSTRUMENTS.

A SUBSCRIBER has put in an extension set of his own and refuses to pay us rent for it. We have told him he must take out his telephone if he did not do so. He refuses and threatens to take out an injunction to prevent us cutting off his source. Have we not the right to deprive him of service if he continues to use the extension set? F. S.

YOU do not state whether you have established a formal regulation to the effect that no telephone instrument shall be used in connection with your line that is not furnished by your company. Assuming, however, that you have established such a regulation, you would have the right, subject to certain restrictions, to cut off service from a subscriber who refused to abide by it. The duty rests upon the company to furnish extension sets as efficient and convenient as the state of the art affords and to do so at a reasonable charge. If its instruments are not efficient or if its charge is unreasonable, the subscriber may install and use his own apparatus. Such sets as the subscriber does use would have to be so constructed as to be of no detriment to the company, both in its demand upon service and in safety. See *Gardner vs. Providence Teleph. Co. (R. I.)*, 49 A. 1004. This case would be pertinent in the suit of Beach and Beach, of Chicago, against the Chicago Telephone Company.

IDENTITY OF PARTY MUST BE ESTABLISHED.

THE Supreme Court of Washington has made a decision covering the effect of telephonic communications and their use as evidence. When J. W. Young, of Seattle, went to Klondike, in the rush of 1898, he left instructions with a friend to have his trunk stored with the Seattle Transfer Company. This friend, A Mr. Ramsey, accordingly called up the company by telephone and asked them to call for the trunk. A second request was made before the trunk was taken away. Mr. Ramsey did not recognize the voice answering him at the telephone and had no means of proving that a Seattle Transfer Company agent got the trunk, save that some one, whom he did not see, called for it.

In the summer of 1901 Mr. Young wrote down from Alaska to his friend Mr. Ramsey to have the trunk forwarded to him. The Seattle Transfer Company was unable to find the property in its warehouse and denied ever having received it. The suit followed, and on the strength of the telephone conversation as above mentioned a jury gave Mr. Young \$240 damages.

The court holds, citing several authorities, "communications, when material to the issues, through the medium of the telephone, may be shown in the same manner and with like effect as conversation had between individuals face to face, but the identity of the

party sought to be charged with liability must be established by some testimony either direct or circumstantial. To hold parties responsible for answers made by unidentified persons in response to calls at the telephone from their offices or places of business concerning their affairs, opens the door for fraud and imposition and establishes a dangerous precedent which is not sanctioned by any rule of law or principal of ethics of which we are aware." The case is accordingly ordered dismissed.

Young vs. Pacific Transfer Co. (Wash.), *Pacific Reporter*.

DENIES BELL'S INVENTION OF TELEPHONE.

TESTIMONY tending to deprive the supposed inventor, A. G. Bell, of the credit of inventing the telephone, and bestowing the honor upon Henry C. Strong, was filed in the United States Circuit Court at Chicago in the report of the special examiner who was appointed by Judge Kohlsaat in 1901 to take evidence in the case in which the Atlantic & Western Telephone Company asks \$50,000,000 damages for alleged infringements upon inventor Strong's patents. The defendants in the suit are the American Bell Telephone Company, the American Telephone and Telegraph Company, the Chicago Telephone Company and the Central Union Telegraph Company.

The basis for the suit is an invention to facilitate long distance telephoning, for which Henry C. Strong secured a patent in 1885. Joined with him at that time were David A. Strong and Henry P. Caldwell, they having secured eleven-fifteenths of his rights by purchase. Subsequently the Atlantic & Western Telephone Company secured the rights of the invention by purchase in 1892, the consideration being \$5,000,000.

Referring to the connection between the various parties, the language of the bill of complaint is as follows:

"That the defendants herein have combined and confederated together and still are combining and confederating for the purpose of depriving your orator of the benefits, advantages and rights secured to him by the latter's patent (the American Bell Telephone Company is named as the parent of the others, who were the agents, employees, representatives, tools and implements of the said defendant), and, whilst outwardly the defendants appear to be Independent corporations, yet there is now, and has been at all times herein mentioned, a secret agreement or trust subsisting and existing between all the defendants herein, and by the terms of which all the defendants have conspired and agreed together to infringe your orator's patent and invention."

The report of the special examiner contains photographs of electrical devices and photographs of patents as secured from the originals in the Patent Department at Washington. In the report is the testimony of C. M. Barnes, who was chaplain of the regiment in the army in which Strong served in 1863. He testified that when Strong's company was encamped in the marshes of South Carolina his attention was attracted to the efforts of the young inventor who was then working on an invention which he declared "would enable two persons to talk to each other when they were more than a mile apart." The patent in question is styled a "combined telegraphic relay and telephone." Henry C. Strong relates that he filed a model with a petition for a patent in 1877. The matter was held up in the patent office, according to his version, because they did not understand so complicated an explanation as his then appeared to be of a closed or continuous circuit by which the telephone would be enabled to transmit articulate speech.

Questions on any subject relating to the technical side of telephony will be answered in this column.

IMPEDANCE OF CONDENSER.—(275)

What is the resistance of a condenser?

C. H. S.

In every alternating-current circuit the current is given by the following expression, in which

I = current in amperes.

E = E. M. F.

K = Capacity in Mfs.

L = Inductance in henrys.

R = Resistance in ohms.

n = the number of periods per second.

$$I = \frac{E}{\sqrt{R^2 + \left(2\pi nL - \frac{1}{2\pi nK}\right)^2}}$$

The usual ringing current is about 16 p. p. s. Now let

$E = 1$.

$I = 1$.

$K = 1 \text{ mf} = .000001 \text{ f.}$

$L = 0$.

$R = 0$.

$n = 16$; then:

$$I = \frac{1}{2 \times 3.14 \times .000001 \times 16}$$

$$I = \frac{1}{2 \times 3.14 \times 16}$$

$$I = \frac{1}{10,000}$$

$$I = \frac{1}{1,000,000}$$

$$I = \frac{1}{1/1000} \text{ hence } R, \text{ the impedance} = 1,000 \text{ ohms (for the}$$

condenser) if K is larger, say, 2 mf, then $R = 500$ ohms, or if smaller, say, $\frac{1}{2}$ mf, $R = 2,000$ ohms; say, $\frac{1}{4}$ mf, $R = 4,000$ ohms. The R above is the apparent resistance or impedance, and not ohmic resistance.

INDUCTION ON A GROUNDED SYSTEM.—(276)

Fig. 276 shows diagrammatically the conditions that we operate under. The electric light system is indicated in dotted lines and the telephone system in full lines. When the electric light is off there is no disturbance of the telephone system; when on, the noise is so great that hearing is difficult with granular transmitters, impossible with Blake's. The noise on routes D and E is about twice as great as on A , B and C when speaking to or from exchange. The insulation of telephone wires is about two megohms per mile. No leakage from electric light can be detected, but earth currents are in evidence.

1. What beyond induction causes the "row" in the telephone?
2. Why is it more intense on D and E than on A , B and C ?
3. Why the earth currents?
4. Why the difference in transmitters? You will note that the routes D and E run nearly parallel with the electric light feeders.

F. N. R.

The arrangement of circuits which you cite seems to be very favorable to the development of inductive disturbances, because the electric light plant which, according to your letter, appears to be the origin of the difficulty, occupies a central position among the telephone lines, which are therefore in the most favorable condition to receive inductive disturbances. The fact that conversation can be carried on with a granular transmitter, and is impossible with a Blake, is owing to the ability of the solid back to produce a very much more powerful sound, while that given by the Blake is too feeble to be heard above the noise produced by induction. That the noise upon D and E is greater than upon A , B and C is owing to the relative arrangement of the various circuits. D and E parallel the electric light plant for a considerable distance, while A , B and C are in an opposite direction. It is

probable that the cause of the noise in A , B and C is attributable to leakage from D and E . It is not strange that no leakage from the electric light plant can be detected, because the telephone receiver is such a sensitive instrument that it requires apparatus of the greatest delicacy to detect the passing of currents which are readily audible in a receiver. The existence of earth currents probably is owing to a leakage from the electric light plant notwithstanding the fact that you have not been able to detect this leakage. But as you did not state how the earth currents were ascertained, nor the kind of instruments or methods of measurements used in determining the insulation of the electric light plant it is impossible to state this positively.

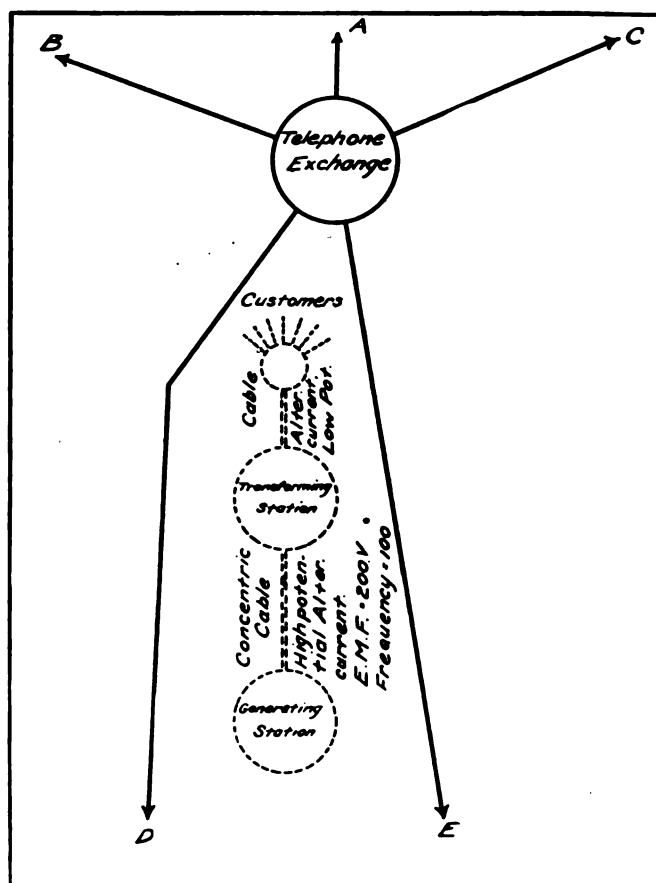


Figure 276.

INTERNAL RESISTANCE OF BATTERY.—(277)

Please publish in your paper some accurate and reliable way of finding the internal resistance of a battery. I have one description where the battery to be measured forms one side of a Wheatstone bridge, but have never been able to get good results from the method. Another that I tried was accomplished by joining two batteries in opposition to one another and then making the measurement with a Wheatstone bridge. This also I found unreliable.

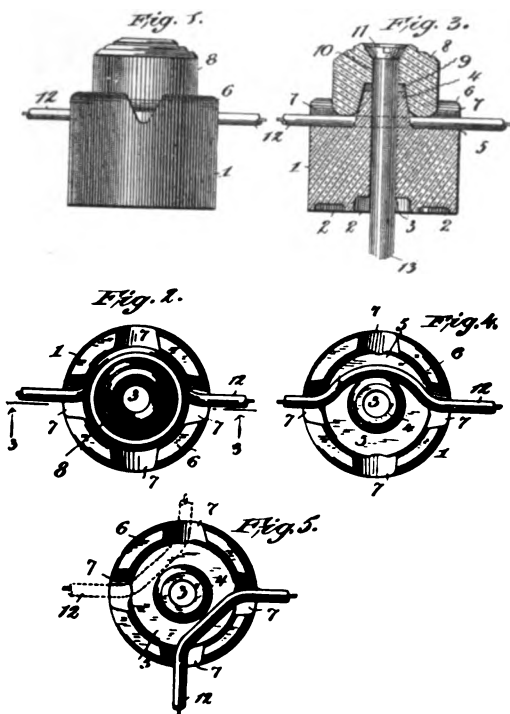
J. T. B.

It would take more space than we can give on our query page to describe methods for making the measurements that you wish. We can, however, refer you to back numbers of THE AMERICAN TELEPHONE JOURNAL which contain in the articles on "Electrical Measurements," by Arthur Vaughn Abbott, just the methods you desire. In THE AMERICAN TELEPHONE JOURNAL of April 11, 1903, Volume 7, Number 15, in Mr. Abbott's article on "Electrical Measurements," there were three voltmeter methods given for finding battery internal resistances. In our issue of July 25, Volume 8, Number 4, a method of finding internal resistance of battery with an ohmmeter is described.

PATENTS ISSUED

IMPROVED INSULATOR.

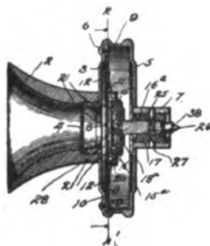
S. Bower, of Brooklyn, N. Y., patents (No. 745,999) an improved insulator. The object of this invention is to provide an insulator which can be more readily applied and will form a better support for the wires than those in existence. The invention is shown in Figs. 1, 2, 3, 4 and 5, inclusive. The insulator consists of a base 1, having a conical projection 4 and a hole through the center, through which the screw 13 can be inserted.



There is a cap 8 which has a recess that fits over the conical projection 4. The top of the base 1 has two grooves 7. The twisted pair is inserted by opening it upon the conical portion and dropping it onto the grooves. Then the cap 8 is placed over the projection 4 and the screw 13 clamps the wire.

TELEPHONE TRANSMITTER.

E. E. Yaxley, of Chicago, Ill., patents (No. 748,906) an improved telephone transmitter and assigns to the American Electric Telephone Co. The object of this invention is to provide a transmitter in which there may be a wide variation of pressure among the carbon granules and at the same time they may be

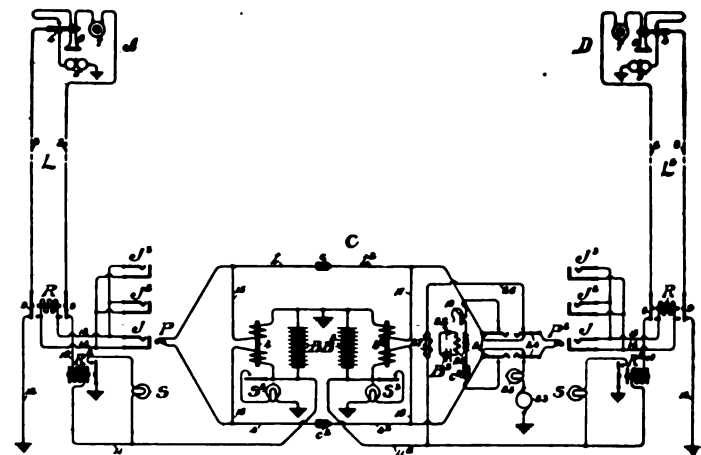


retained in a sensitive condition. A sectional view of Mr. Yaxley's transmitter is shown in the figure. There is the usual mouth piece, 2, which is secured to a front plate of metal 3, upon which is secured the diaphragm 8 within the annular flange 9 having a ring of paper or similar material between the diaphragm and the casing. The diaphragm is held in place by two springs 11. There is a cup-shaped black electrode of brass or other material covered with concentric grooves. To the inner surface of

the diaphragm 8 and inside of the ring 20 a layer 28 of carbon granules is affixed by means of cement of high conductivity. The chamber formed by the rear electrode, the diaphragm and a felt ring are then partially filled with carbon granules which wedge themselves into rectangular concentric grooves of the electrode and are held thereby. It is claimed that this arrangement of the carbon is exceedingly effective. In order to prevent the transmitter from being tampered with after it is once adjusted, an aperture 25, is drilled through the hub 7, sleeve 17, and into the screw 16a, into which an insulating pin, 26, is driven. Thus it is impossible to change the position of the screw.

COMMON BATTERY SWITCHBOARD CIRCUIT.

Albion D. T. Libbey, of Chicago, Ill., patents (No. 749,306) and assigns to the Kellogg Switchboard & Supply Company, of Chicago, an improved common battery switchboard circuit. This invention relates to telephone systems in which cut-off relays are bridged across the talking circuits wherein it is necessary to operate these relays during the entire time that the subscriber calls. Ringing keys are liable to open the battery circuit and thus release the cut-off relay, and the one object of this invention is to provide an improved circuit to do away with this objection. It is illustrated in the figure. A and D are two substations connected with the central office by the lines L and L2 which end in the jacks J that are provided with cut-off relay R and line signal R2. When a subscriber calls the line relay R2 is excited by means of the bat-

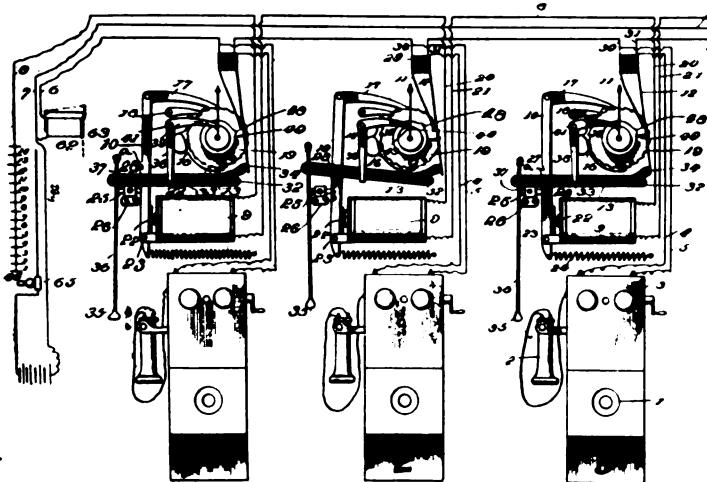


tery B, and the signal lamp S eliminated. The insertion of the plug P operates the cut-off relay R and extinguishes the line signal. Turning to the connecting cord P2, it is seen that this cord is supplied with a ringing generator, 23. When the key, 24, is pressed, the cord circuit is opened, but to prevent the cut-off relay from falling back a branch circuit from battery B2, through conductor 11a, coil 27, conductor 26, to the tip of the plug, is provided and this is sufficient to prevent the cut-off relay from releasing.

PARTY LINE SYSTEM.

Hope Redmond, R. Hall and R. H. Conway, of Cynthina, Ky., patent (No. 749,225) an improved party line system. The object of this invention is to provide a party line system in which each subscriber's instrument which is used locks out all other instruments on the line, thus rendering conversation private and also a system whereby signalling may be selective. This invention is shown in the figure. This is another one of the many step by step methods whereby it is intended that a party line system embracing both secrecy and privacy may be achieved. As shown, each substation is provided with an electro magnet 9 which operates a lever 10, to which a ratchet 17 is attached that bears upon

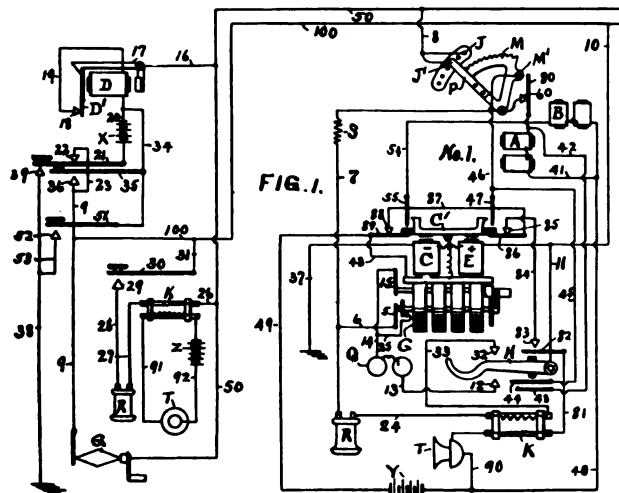
a gear wheel 39. Every time that an impulse is sent over the line this ratchet drives the wheel along, and by arranging suitable contacts upon the periphery of this wheel, the circuits of various substations may or may not be completed at the pleasure of the operator. In this manner selective signalling is obtained. So long as current is traversing the line, the electro magnetic mechanism is locked and no other subscriber can use the circuit, but



as soon as conversation is ended the lever 35 permits the mechanism to be restored and other conversation can be held.

PARTY LINE SYSTEM.

N. E. Norstrom, of Chicago, Ill., patents (No. 748,980) and assigns two-thirds to J. Anderson and E. M. Richardson, of Sterling, Kansas, an improved party line system. This invention applies to telephone exchanges and especially those which make use of series party lines. One object is to provide a method whereby, when two stations are in conversation another station cannot signal over the line and interfere with the parties talking. The invention is also designed to provide a system which is secret in all respects. This patent is a complicated one, requiring three sheets of drawings for its explanations, and it is only possi-

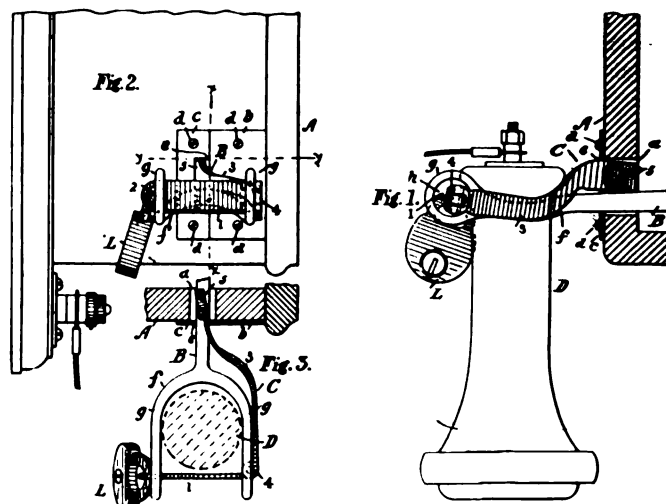


ble in this digest to give a general idea of the methods of the inventor. A skeleton of the circuits employed is shown in the figure. Each substation set is provided with a step by step motion *M*, which is controlled by the magnets *A* and *B*. There are also two polarized relays, *C* and *E*. The step by step motion operates an arm, *P*, which traverses a board of sliding contacts, *J*. To call any station selectively the operator sends impulses through the magnets *A* and *B*, thus moving the arm *P* and all stations over the contacts upon the plate *J*. Each station has its particular contact in a different position upon this plate. This contact is in series with the bell, consequently when the arm is moved over any particular point only the bell of that station which is connected with this point will ring. The polarized relays *E* and *C* are used in connection with the step by step mechanism in order to control and release the same in the proper manner. Those

who are interested in selective signal party lines will do well to procure the complete patent.

LOCKING DEVICE FOR TELEPHONE APPARATUS.

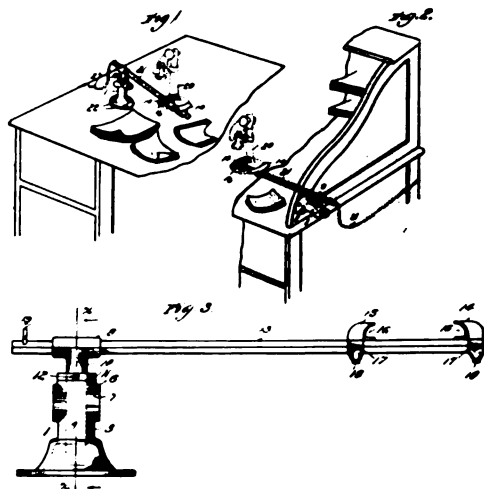
S. J. Larned and J. S. Ford, of Chicago, Ill., patent (No. 749,388) an improved method of locking telephone apparatus. This invention relates especially to a locking device whereby a subscriber's sub-station may be temporarily closed and the use thereof prevented. It is shown in Figs. 1, 2 and 3. In the illustrations *A* represents the ordinary box of a substation set from the side of which the switch hook *B* extends, holding the receiver *D*. The inventors provide a hinged strip of metal *c* containing a padlock *1* at one end and provided with a boss *5* at the other. As



is shown in the illustrations, it is proposed to insert the boss *5* over the top of the switch hook *b*, in the slot in the side of the telephone station and then to carry the portion *1* through the perforations in the end of the switch hook, and to lock the same in place by means of the padlock *1*. By this means the switch hook is prevented from rising. Consequently, the receiver cannot be removed and the telephone is kept out of service so long as this device remains in place.

TELEPHONE SUPPORT.

C. H. Pelton and Wm. Ramsey, of Springfield, Ohio, patent (No. 748,524) an improved support for desk sets. The object of this invention is to provide a simple, effective and readily adjustable method of supporting a telephone at a desk in such a manner that it may be readily adjusted in any desired position.



The invention is shown in Figs. 1, 2 and 3. Referring to Fig. 3, the inventor provides a base *1*, that may be screwed or fastened to the top of the desk or to the side at pleasure. In this base is a pivoted shaft, *10*, that carries a sliding bar, *13*. On the end of the bar *13* clamps *16* are arranged, designed to secure the pedestal of the desk set. By this arrangement the set can be moved in and out by sliding the bar *13* through the socket *8* or can be turned at any desired angle by means of the shaft *10*.



FINANCIAL

POMONA, CAL.—The Pomona Mutual Telephone and Telegraph Company will issue \$20,000 worth of 6 per cent. bonds for completing the work of construction. Secretary D. S. Parker reports that 500 subscribers have been secured.

MASON CITY, IA.—The U. S. Telephone & Telegraph Company has filed a deed of trust to the Federal Trust & Savings Bank for \$200,000. It is signed by James Gardner, president of the company, and James H. Shumaker, secretary.

FALL RIVER, MASS.—The Fall River Telephone Company has paid its fourth quarterly dividend at the rate of 5 per cent. per annum. It now has 1,160 stations, an increase of about 100 for the quarter. Although its toll rate to the New Bedford Automatic exchange is 10 cents, and the New England T. & T. Co. has reduced its rate from 15 cents to 5 cents between these points, the earnings of the company's toll lines show a steady increase.

DETROIT, MICH.—The stockholders of the Co-Operative Telephone Company have approved a bond issue of \$40,000 for extensions and improvements.

SAGINAW, MICH.—The regular meeting of the directors of the Valley Telephone Company was held recently, and the usual 2 per cent. quarterly dividend was declared.

GOWANDA, N. Y.—The Commercial Telephone Company of Gowanda has given a mortgage for \$50,000 to the Boston Safe Deposit and Trust Company.

ROCHESTER, N. Y.—The Rochester Telephone Company has given a mortgage to the Rochester Trust & Savings Deposit Company for \$3,000,000, payable October 1st, 1933, with interest at 5 per cent.

ROCHESTER, N. Y.—The directors of the Rochester Telephone Company have authorized the retirement of the preferred stock of the company, amounting to \$150,000.

PORTAGE, WIS.—The Portage Telephone Company, by W. H. Little, president, and L. F. Schulze, secretary, has increased its capital stock from \$4,000 to \$30,000 and the number of its directors from three to five.

FRANCHISES

LONGMONT, COLO.—The Farmers' Club of this city has asked the city council for a franchise to construct an independent telephone system covering the city and a large farming territory. The club has several propositions from capital to install the system if a franchise can be obtained.

KEWANEE, ILL.—The Kewanee Home Telephone Company has been granted a franchise by the commissioners of Henry County to construct lines throughout the county.

PILOT MOUND, IA.—The Pilot Mound Mutual Telephone Company will incorporate with a capital stock of \$10,000, and will ask for a franchise from the city council of Pilot Mound.

VINELAND, N. J.—The city council has passed on final reading the ordinance giving the Mutual Telephone Company a franchise.

CANASTOTA, N. Y.—H. R. Jaqua, of Syracuse, an independent telephone promoter, has interested several local business men in a local company, which will ask for a franchise and construct a local system. Business men have presented a petition to the Bell Company asking for a lower rate. If this is not complied with the new company will no doubt be immediately organized.

YORKVILLE, N. Y.—The village trustees have granted a franchise to the Utica Home Telephone Company.

DELPHOS, O.—The Delphos Home Telephone Company has been granted a local franchise for fifteen years.

NEW LEBANON, O.—V. F. Weaver and others have organized a local telephone company with forty-three subscribers. They have applied to the county commissioners for necessary county franchises for the construction of a complete system.

COMBINATIONS

HEYWORTH, ILL.—Henry Fitchorn has purchased the Wakefield Telephone Line from William Richards.

SHERARD, ILL.—The Home Mutual Telephone Company has secured a controlling interest in the telephone exchange at Aledo.

WEBSTER CITY, IA.—The Stratford Telephone Company has accepted the option of \$4,000 which they hold on the Chamberlain franchise in this city. It is expected that the Independent lines in this vicinity will consolidate in the name of the Hamilton County Independent Company and that an exchange will be put in Webster City to have connection with 1,100 rural subscribers. \$3,000 has been subscribed by business men, and it is expected to have \$5,000 in a short time.

LESLIE, MICH.—An effort is being made to unite the Rural Telephone lines running into Leslie into one company. Temporary arrangements have been made with the Leslie exchange until some action is taken.

LA GRANGE, MO.—The Canton and La Grange Telephone Company held a meeting recently, at which it was decided to consolidate with the Citizens' Telephone Company of North Missouri, which was incorporated recently.

BRYAN, O.—The Bryan Telephone Company and the Williams County Toll Line Company were consolidated recently, the Bryan Company buying the other. Mr. O. L. Spangler, who was auditor of the Williams Company, has been appointed manager of the combination. The board of directors is: E. B. Willett, C. S. Roe, J. A. De Vore, W. H. Gardner, E. E. Newman, R. L. Starr, G. A. Christman, John M. Walker, W. W. Morrison.

CELINA, O.—The Celina and Mercer County Telephone Company has purchased the Co-Operative Telephone Company of Coldwater, and will extend the service to patrons in the country and improve the equipment in every way possible.

BEEVILLE, TEX.—The rural telephone lines from here to Oakville, with branches to nearly all the ranches west of here, including the Beeville exchange, have been sold to I. N. Powell, of this city.

ELECTIONS

RICHMOND, MO.—At the recent meeting of the Trans-Missouri Telephone Association, composed of the owners of independent companies in that section of the State, F. G. Taggart was re-elected president and James M. Deacy secretary and treasurer. The next meeting will be held at Carrollton on the last Thursday in March.

WILTON, N. H.—The Wilton Telephone Company has elected the following officers: George E. Bates, president; W. H. Emerson, secretary and treasurer; H. L. Emerson, general manager. W. F. Clark, W. I. Durgin, Dr. C. E. Higgins, directors. The company has 80 telephones in use and over 30 miles of wire.

CORTLAND, N. Y.—The Cortland Home Telephone Company has elected the following officers: Dr. C. D. Ver Mooy, president; C. P. Walrad, vice-president; H. L. Smith, secretary; G. J. Mager, treasurer; R. L. Davis, attorney, and F. V. Bennett, manager.

GLOVERSVILLE, N. Y.—The Glen Telephone Company has elected the following officers: C. B. Knox, L. M. Littauer, D. A. Hayes, E. S. Parkhurst, H. A. DeGraf, D. S. Dempster, E. C. Evans, Ed. Edwards, John Martin, A. V. H. Stuyvesant, W. A. Smith, G. Levor, J. S. Edwards.

LOWVILLE, N. Y.—The Black River Telephone Company of Lowville has elected the following officers: Hon. Theodore B. Boselin, of Croghan, president; Homer C. Markham, of Lyon Falls, vice-president; S. C. Caperton, of Leydan, secretary; C. W. Pratt, of Booneville, treasurer; Julius H. Wood, of Lowville, assistant secretary and treasurer. J. Domser, of Booneville, general manager. The company now has about 250 telephones at the Lowville exchange and a great many in other towns north of Utica. In the Spring the company will add 50 telephones to the local exchange.

ROME, N. Y.—The Rome Home Telephone Company has elected the following officers: Fred M. Shelley, president; John S. Wardwell, vice-president; D. Odell, treasurer, and manager. The directors are Fred. M.

Shelley, John S. Wardwell, John C. Wardwell, John E. Mason, James S. Brailey, Jr., Wm. J. Grogan, I. H. Griswold and T. M. Brush. The company has at present 1,004 telephones in service.

BELLEFONTAINE, OHIO.—The United Telephone Company has elected the following directors: W. W. Fisher, C. E. Yoder, W. C. Huston, F. M. Johnson, G. H. Wilson, G. M. Stevenson, J. C. Brand, Alfred Butler, Beele W. H. Fledderjohan of New Knoxville; L. A. Faucett, Rushsylvania, R. S. Ciptors, of Algier; F. N. Gales, of Degraf; Will Harris, of East Liberty; A. C. Moore, of West Mansfield.

BRILLIANT, OHIO.—The new company recently incorporated by residents of Brilliant, Mingo and Portland, has elected the following officers: Robt. Carpenter, president; C. I. Waddle, vice-president; James L. Cox, treasurer; J. G. Gilgrist, secretary. It was decided to immediately begin the work of constructing a line from Steubenville to Bridgeport. At Bridgeport it will connect with the Independent Telephone Company of Wheeling, and will thus secure long distance connections with Pittsburg, Zanesville and many other points. Exchanges will be established at Rush Run, Portland, Dillan, Yorkville, Tiltonville, etc.

PHILADELPHIA, PA.—At the annual meeting of the Keystone Telephone Company of New Jersey, the holding company of the Keystone Telephone Company of this city, held in Camden, N. J., the following directors were elected: J. M. Mack, Jacob Ridgway, Michael Murphy, Norman Gray and Marcus Beebe.

BELMONT, W. VA.—The Belmont Telephone Company has elected the following directors: J. C. Heinlein, president; Henry Schmulbach, vice-president; J. C. Dent, treasurer; A. J. Heinlein, H. L. Armstrong, J. W. Doudna, of Barnesville, and C. L. Weems, of St. Clairville.

ANTIGO, WIS.—The Antigo Telephone Company has elected L. L. Gibbs secretary and general manager of the company.

GRAND RAPIDS, WIS.—The Wood County Telephone Company has elected the following officers: G. W. Paulus, president; J. E. Daly, vice-president; Theo. Brazean, secretary; G. W. Davis, treasurer; E. C. Starks, general manager.

EDMORE, N. D.—Farmers east of Edmore are considering the construction of a telephone line between Edmore and Park River. It is thought that at least fifty telephones would be subscribed.

MASON, O.—The Valley Telephone Company, of which W. G. Thompson is manager, has purchased a lot and will erect a \$1,500 exchange building. A first-class plant will be erected, using metallic circuit throughout.

ERIE, PA.—The Erie Mutual Telephone Company will construct several party lines into the country in the near future.

LOYSBURG, PA.—The Morrison Cove Telephone Company will extend its lines in the spring. The lines have recently been completed from Loysburg to Hopewell.

RIPON, WIS.—The Ripon Telephone Company will move its exchange into larger quarters.

MOBILE, ALA.—The Home Telephone Company has elected the following officers: E. Eichold, president; A. S. Lyons, treasurer; Robt. L. Douglas, secretary.

TAMPA, FLA.—At the annual meeting of the stockholders of the Peninsular Telephone Company the following officers were elected: W. G. Brorin, Tampa, president; Guy Hoffman, St. Marys, O., vice-president; H. W. House, Wapakoneta, O., secretary; Guy Hoffman, treasurer.

GALESBURG, ILL.—The Galesburg Union Telephone Company has elected the following directors: G. B. Churchill, Lafayette Weinberg, H. M. Chase, D. L. Peterson, Geo. L. Price, P. N. Granville, Nels M. Burgland, I. S. Callander, W. N. Phillips, W. E. Terry, B. F. Brown.

INDUSTRY, ILL.—The Industry Rural Telephone Company has elected the following officers: R. E. McGaughey, president; Mort Wilson, secretary, and M. V. Lawyer, treasurer.

OSCO, ILL.—The Osco Telephone Association has elected the following officers: J. H. Smith, president; Henry Bester, secretary and treasurer; Luther Westerland, Frank Magerson, John Sederberg, Henry Combs, Claus Anderson, J. Heber Smith and Henry Anderson, directors.

SYCAMORE, ILL.—At a meeting of the stockholders of the DeKalb County Telephone Company, H. J. Stark and J. M. Joslyn were elected new directors. Mr. Stark succeeds the late A. H. Knapp. The other directors are O. P. Herrick, S. O. Pike, G. M. Sivwright and Elthom Rogers. The directors re-elected the same officers. Over and above the earnings expended in additional lines a dividend of 7 per cent was paid last year.

WABASH, IND.—The Home Telephone Company has elected the following officers: Dr. R. T. Blount, president; N. G. Hunter, vice-president; W. S. Stitt, secretary; John Hipkind, treasurer; F. N. Lake, director; Wilder Kendall, manager.

ALBIA, IA.—The Albia Telephone Company has elected the following officers: Grant Hieseman, president and general manager; J. C. Robeson, vice-president; John Rentz, secretary; J. C. Johnson, treasurer. Directors: J. C. Robeson, J. S. Moon, Grant Heiseman, John Rentz and J. C. Johnson.

COTTAGE, IA.—The telephone meeting was held in the Spring Branch creamery recently. Officers are as follows: President, James Lake; vice-president, E. A. Van Patter; secretary, E. D. Dunn; treasurer, Peter Carnahan; directors, Frank Bunce, Will Thompson, Frank Riley.

DES MOINES, IA.—The Mutual Telephone Company has elected the following officers: J. S. Bellamy, of Knoxville, president; J. W. Hill, of Des Moines, vice-president; L. M. Grimes, of Des Moines, treasurer; F. C.

Hubbell, M. McFarlin, J. C. Bellamy, E. H. Martin and J. W. Hill, executive committee; M. McFarlin, F. C. Hubbell, J. W. Hill, L. M. Grimes and J. C. Hume, of Des Moines, Clyde E. Brenton, of Dallas Center, E. H. Martin, Webster City, J. S. Bellamy, of Knoxville, and O. C. Herman, of Boone, directors.

ESSEX, IA.—The City Telephone Company has elected the following officers: C. J. Johnson, president; John Hagglund, vice-president; F. O. Peterson, secretary; G. J. Liljidadl, treasurer.

FREMONT, IA.—The Farmers and Traders' Telephone Company has elected these directors: O. C. Cochran, Wright; T. O. Stewart, White Oak; Seth Randall, Wright; W. S. Mowery, Fremont; Will Fellers, Fremont.

GALAVA, IA.—The Galava Telephone Company has elected the following officers: Robert Baxter, president; George Clapsaddle, vice-president; S. W. Neville, M. M. Elk, Wm. Schmidt, John Williams, James H. Fair, directors. George Whealan, treasurer, and H. M. Walters, secretary.

IOWA CITY, IA.—The Iowa City and West Branch Telephone Company has elected the following officers: J. T. Struble, president; John Sebell, vice-president; James Murphy, secretary; Luther Brown, treasurer; James Douglas and L. H. Langenberg, directors.

LA PORTE, IA.—The following officers have been elected by the Central Iowa Telephone Company: President, James R. Skinner; vice-president, J. H. Funk; secretary and treasurer, W. V. Shipley. The directors are: P. C. Dings, Geo. L. Stearns, J. H. Funk, R. C. Kennedy, Jos. Husman, E. D. Moorer.

MINGO, IA.—The Mingo Farmers' Mutual Telephone Company has elected the following officers: M. F. Berkeley, president; W. J. Gammon, vice-president; Fred Loerch, secretary, and N. A. Ballers, director.

NEVADA, IA.—The Nevada Mutual Telephone Company has elected Frank H. Boardman for secretary and manager and H. B. Craddock for treasurer. The board of directors now consists of R. A. Frazier, J. A. King, E. C. Button, M. C. Allen, L. E. White, U. S. Alderman and George Conolly.

WEST LIBERTY, IA.—The South Prairie Mutual Telephone Company, at a meeting held here recently, elected the following directors: J. P. Nichols, J. P. Mountain, A. Anderson, W. J. Barkley, H. L. Metcalf.

ABILENE, KAN.—The Union Telephone Company, which is building a toll line from here to Kansas City, elected these officers: A. T. Rodgers, Beloit, president; H. P. Wareham, Manhattan, vice-president; C. L. Brown, Abilene, secretary.

OSBORNE, KAN.—The Osborne-Cheyenne Telephone Company has elected the following officers: Jasper Rodgers, president; C. W. Stansberry, vice-president; B. F. Hilton, secretary; I. L. De Moss, treasurer.

LEWISTON, ME.—The Lewiston & Green Telephone Company has elected the following officers: R. Alden, president; Harry Merrill, clerk; H. M. Blake, treasurer.

SOUTH PARIS, ME.—The Citizens' Telephone Company has elected the following officers: A. L. Holmes, president; Frank A. Shurtleff, vice-president; J. G. Littlefield, clerk and treasurer.

BALTIMORE, MD.—At a meeting of the Cumberland Valley Telephone Company, held at the office of Hinkley & Morris, the following officers were elected: John Hinkley, president; Samuel R. Caldwell, treasurer; William D. Bernard, Louis J. Berger, Charles M. Clement, Thomas Foley Hisky, George W. Leonard, Thomas J. O'Neill and C. A. E. Spamer.

GRANBY, MASS.—The Granby Telephone & Telegraph Company has elected the following officers: W. G. Ferry, clerk and treasurer; George F. Eastman, auditor; J. J. Bateson, president.

SPRINGFIELD, MASS.—The Home Mutual Telephone Company, of Sherrard, has increased its capital stock from \$10,000 to \$50,000.

DETROIT, MICH.—The Co-Operative Telephone Company has elected the following directors: C. M. Burton, Max J. L. Towler, J. C. Danziger, J. W. Haviland and A. A. Coles.

KALKASKA, MICH.—The Swaverly Telephone Company, at a meeting held here, elected the following officers: A. E. Palmer, president; H. Bockes, vice-president; James A. Harriot, secretary and treasurer; C. W. Swaverly, manager. J. V. Moran and H. L. La Bar, directors.

SAGINAW, MICH.—The Valley Telephone Company held their annual meeting recently and elected the following officers: J. E. Davidson, Bay City, president; John L. Jackson, Saginaw, vice-president; R. T. Johnson, Bay City, secretary and manager; C. B. Curtis, treasurer.

BLAINE, MINN.—At a meeting of the Blaine Telephone Company the old officers were re-elected, as follows: B. H. Urnes, president; A. Seely, vice-president; N. N. Holmen, secretary; M. M. Monon, treasurer.

CLINTON FALLS, MINN.—The Clinton Falls Rural Telephone Company has elected the following officers: F. W. Adams, president; A. O. Newhall, secretary; C. M. Finch, treasurer.

HUTCHINSON, MINN.—The Hutchinson Telephone Company has elected the following directors: W. E. Harrington, Wm. Davidson, D. S. Sivright, H. L. Merrill, W. E. Sivright, C. G. Odquist and W. L. Clay.

STOCKHOLM, MINN.—The annual meeting of the Farmers' Telephone Company was held here and the following directors elected: John Eklof, V. W. Mellquist, C. J. Carlson, M. P. Mortenson, August Sahlberg. The directors elected the following officers: President, John Eklof; vice-president, August Cahlberg; secretary, V. W. Mellquist; treasurer, M. P. Mortenson. A dividend of 6 per cent was declared. It is generally understood the company will build and extend telephone lines this year.

FARMINGTON, MO.—The Farmington Telephone Company at its annual meeting re-elected T. P. Pigg, president and manager, D. F. Gleasing, secretary, and M. P. Cayce, treasurer.

MARYSVILLE, MO.—The Hanamo Telephone & Telegraph Company has acquired a lease and franchise of the State Line Telephone Company, which operates in the towns of Elmo, Md., Blanchard, Coln, College Springs, and North Boro, Iowa. By this means it will gain entrance into Omaha and Des Moines.

BLAIR, NEB.—The Mutual Telephone Company has elected the following officers: John McMahon, president; L. E. Ward, vice-president; S. W. Chambers, secretary; George Riker, treasurer.

YORK, NEB.—The York County Independent Telephone Company has elected the following directors: J. Kirkpatrick, E. E. Lincoln, Alfred B. Christian, J. M. Bell, George Holden, Commodore Beaver and Dr. Straighth. The company earned 12 per cent. last year.

BAINBRIDGE, N. Y.—The Bainbridge Telephone Company has elected the following officers: James Hyde, president; Erwin Ransdale, vice-president; E. D. Truman, secretary; O. L. Crumb, assistant secretary; George L. Lyon, treasurer; Frank C. Smith, general manager.

PERSONAL

EDWARD BAUMANN, who has been acting as assistant manager of the Chicago Telephone Company's exchange at Harvey, Ill., has been transferred to the Marengo exchange.

T. M. DERICKSON, manager of the Chattanooga exchange of the East Tennessee Company, has been promoted to the position of manager of the Memphis Exchange. This comes in the nature of a promotion, as the position in Memphis is much more remunerative and carries with it considerable more responsibility as it has about twice as many subscribers as the Chattanooga exchange.

GEORGE M. DUGAN, superintendent of telegraph and telephone for the Illinois Central Railway, was at New Orleans, La., recently. Mr. Dugan is making a tour of inspection of the telephone and telegraph service of the system.

CASPER GAMBRIL, of Rob Roy, Ind., has been elected by the directors of the Shawnee Telephone Company, of Attica, Ind., to take charge of their telephone plant at Stone Bluff.

W. B. HARPER, formerly cashier and auditor of the People's Home Telephone Company, of Birmingham, Ala., has been made general manager of the system to succeed Robert H. Polk, who has become vice-president and general manager of the Memphis Telephone Company, of Memphis, Tenn.

H. W. HOSTETTLER resigned as manager of the Citizens' Telephone Company, Sumner, Ill., and G. H. Cunningham was selected to fill the vacancy.

R. F. JOHNSON, general manager of the Valley Telephone Company, of Saginaw, Mich., accompanied by Mrs. Johnson and daughter, has gone to West Baden, Ind., and will spend a month's vacation there.

R. A. KNAPP, Kankakee, Ill., manager of the Central Union Telephone exchange, has been transferred to charge of the Springfield exchange. He will be succeeded at Kankakee by O. K. Baldwin, of Danville.

HOCK WILLIAMS, of Kingston, is now general manager of the Vance Telephone Company at Oliver Springs, Tenn.

A. W. LARSON has resigned the superintendency of the Telephone Company, Wausaukee, Wis. He has been succeeded by C. C. Rice, of Pound, Wis.

MISS FLO. MARSHALL, chief operator of the Bryan Telephone Company, of Bryan, Ohio, resigns February 1, 1904, to become the wife of Joe Lanty, of Archibald, Ohio.

J. F. OGDEN, of Shamokin, Pa., has been appointed superintendent of the United Telephone Company in the Shamokin division, in place of W. G. Davis, of that town, who resigned to accept a similar position in Texas.

OMAR L. SPANGLER has been appointed manager of the recently made combination of the Bryan Telephone Company and the Williams County Toll Line Company at Bryan, Ohio.

E. F. TRIPLETT has accepted a position with the U. S. Telephone Company of Cleveland, Ohio.

PAUL W. BOSSART, after an absence of about four months, has again assumed the duties of manager of the Philadelphia office of the Kellogg Switchboard & Supply Company.

C. H. JUDSON, who accepted the position of general manager of the Kansas City Home Telephone Company, has been compelled to abandon his work in order to be present at the bedside of his wife, who is seriously ill in Council Bluffs, Iowa. As he is likely to be absent from business for a considerable time he has handed his resignation to his company.

RAY H. MANSON has resigned his position as sales engineer of the Kellogg Switchboard & Supply Company, and has accepted the position of first assistant engineer of the Dean Electric Company, of Elyria, Ohio. He was with the Kellogg Switchboard & Supply Company for three years.

MISCELLANEOUS

JACKSONVILLE, FLA.—Application for a receiver for the Jacksonville Telephone Company has been made by A. W. Cockrell & Son, attorneys for Dr. W. Hume Shine, trustee. The parties interested financially in the company wish to see it put on a paying basis, and hence the application for a receiver.

SOUTH BEND, IND.—The Minnesota Valley Farmers' Mutual Telephone Company will shortly change from a mutual concern to a stock company, and the money secured from the sale of the stock will be employed for new construction.

COLORADO, TEX.—The Texas Pacific Telephone Company has filed a mortgage to its charter changing its headquarters from Abeline to Colorado.

TAMAQUA, PA.—The exchange of the United Telephone & Telegraph Company in this place was gutted by fire through the explosion of an oil stove.

UNDERGROUND

JERSEY CITY, N. J.—The Corporation Council has sent to the Street and Water Board of Council draft of a bill providing for the burial of telephone and other wires. The bill was drawn at the request of the Board, and will be introduced into the legislature.

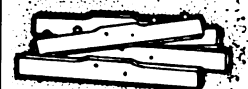
TROY, N. Y.—Mayor Hogan has served notice on the Troy Telephone & Telegraph Company, The American Telephone & Telegraph Company, The Rensselaer Telephone & Telegraph Company and the Telephone & Traction Company requesting that overhead wires inside of the business section of the city be removed by them in compliance with the ordinance recently adopted by the city council.

OBITUARY.

DR. GEORGE P. HACHENBERG, aged 80 years, died recently at his home, two miles from Austin, Tex. In 1864 he wrote an article for Godey's Lady Book, containing the first plans of the principle and practical application of the invention of the telephone.



New Construction in the Field



CALLAO, MO.—The Callao Telephone Company has received all its construction material. As soon as the weather permits work will be commenced in erecting the poles and wires over town. A 100 self-restoring drop, full metallic circuit switchboard, of the latest design, together with a full line of telephones, have been ordered, as also a power generator for ringing. A toll line connecting with other towns is being arranged.

LA GRANGE, MO.—The Lewis County Telephone Company held a meeting recently and decided to install a long distance switchboard at Canton. The switchboard will have a capacity of about 20 lines, and will give the company long-distance connections with St. Louis, Chicago and Kansas City.

HAMILTON, MONT.—The Bitter Root Telephone Company, which was organized some time ago, of Hamilton capitalists, will construct a line from Hamilton to Darby which will take in the logging camps of the Anaconda Copper Mining Company.

LONG PINE, NEB.—William Knottes, who owns the telephone system now in use here, has decided to install the Clark automatic exchange system.

WOLFBOBO, N. H.—Citizens of this place are talking of constructing a local telephone line.

BROOKFIELD, N. Y.—The York Independent Telephone Company of

Brookfield has secured a good many subscribers in Cincinnati, and will install an exchange here.

PLATTSBURGH, N. Y.—The Clinton Telephone Company is at work on its new system, which it will have in operation by next summer. The company is making use of a large number of hollow steel poles.

NEW BERN, N. C.—The Home Telephone & Telegraph Company will spend \$15,000 on improvements.

SANDUSKY, OHIO.—Owing to the increased number of subscribers the operating board of the Sandusky Telephone Company is being enlarged. The change will enable the company to take care of 400 more subscribers.

WARREN, OHIO.—The Warren & Niles Telephone Company will construct a line between here and Niles.

GREENVILLE, PA.—It is proposed to make Greenville the center of a large system of rural telephone lines. A meeting was held in Alliance, Salem township, recently, at which a company was organized with the following officers: Humphrey Orr, president; T. L. Phillips, secretary. M. C. Brown, of West Salem township, is working in the interests of a similar system in his township, where it is said 125 farmers have agreed to subscribe. These lines will all connect with the system in this place.

BOOK REVIEWS

MODERN WIRING DIAGRAMS AND DESCRIPTIONS: By Henry C. Horsman and Vittor H. Tousley. Published by Fred J. Drake & Company, Chicago, Ill. 157 pages; 177 illustrations. Price, \$1.50.

This little volume fulfills more than is often customary, the promise of its title page. It is a set of wiring diagrams of various kinds, together with concise descriptions that are tantamount to specifications indicating the methods to be observed in putting into execution the designs which are offered. The volume commences with the simplest kind of wiring diagrams, those which are adapted to call bells and similar installations. It then takes up various annunciator systems such as are applicable to hotel installations and those which are required where there are many stations. Next telephone wiring is discussed, but this subject is treated in an exceedingly brief and cursory manner, not at all in keeping with the excellence of the rest of the volume. The various forms of telegraph circuits succeed, then automatic fire alarms and the various methods of wiring circuits containing direct and alternating current apparatus. Here there is already literature galore and in this branch the volume does hardly more than that which is already known. It is pre-eminently a pocket book and will be found exceedingly convenient and valuable to the wire man as a source of memoranda to aid in the installation of circuits of all descriptions.

TRADE NOTES

THE KELLOGG SWITCHBOARD & SUPPLY COMPANY announces that F. J. Lommerque has been appointed general manager of sales department and consulting engineer and has taken charge of the sales department at Chicago, Cleveland, Philadelphia and other places where the company has offices.

THE S. H. COUCH COMPANY, of 162 Pearl street, Boston, Mass., reports large sales on its No. 10 telephone. This little set, owing to its attractive design, is in great demand for residence and apartment hotel systems. The company will gladly mail descriptive bulletins containing diagrams to anyone interested.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has secured the services of Mr. Geo. H. Pierce, who formerly represented the Stromberg-Carlson Company in New York and New Jersey. Mr. Pierce has been assigned to the Iowa territory, with headquarters at Des Moines, and his many friends throughout the East will wish him success in his new location.

THE DE VEAU TELEPHONE MANUFACTURING COMPANY, of 27 Rose street, New York City, has favored us with a souvenir post card, upon which New Year's greetings are wished. The card itself is a novel affair. It shows the sky line of lower New York City from the North River. Colored transparent papers are so arranged in the picture that when the card is held to a light one imagines that he is seeing the city on a winter's evening, when the buildings and boats are lighted up. The result is very effective.

THE F. BISSELL COMPANY, of Toledo, Ohio. One of the most convenient devices in modern advertising, is the supply from time to time, of catalogues issued in the form of bulletins which may be bound in any convenient binder and kept for reference. The latest publication of The F. Bissell Company, termed a "Perpetual Catalogue," is a leaflet of some 16 pages, fully illustrated and devoted entirely to telephonic specialties. Each article has a proper illustration, an explicit and yet concise description accompanied with code word and price. The various forms of alley arm braces are particularly noteworthy, as they form a departure from the goods ordinarily offered for this purpose. Cable arm braces and conduit rods exhibit some conspicuous novelties and the same might be said of pole distributing rings. All in all, the circular described is an exceedingly convenient price reference with which all exchange managers would do well to supply themselves.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—1,000 series telephones in the best of condition and ready for immediate delivery, \$4.00 each. Address, C. H. A., care THE AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Building, Chicago, Ill. 127

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

SAVE A DOLLAR OR \$0. Toll Tickets. Your choice of five forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. Gildart Brothers, Albion, Mich. 131

POSITION.—Wanted in an exchange of not over 200 to 250 subscribers, in Missouri preferred, by a telephone man with a technical education. Address, Box 123, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 123

POSITION.—Wanted as manager or superintendent of an exchange of 200 to 800 subscribers. Satisfaction guaranteed. Seven (7) years' experience. State salary. Married, strictly temperate. Address, Box 129, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 129

POSITION.—Wanted by telephone man with eight years' experience with Bell and Independent companies. Best of references from present and former employers regarding work and character. 26 years of age; married; strictly temperate. Address Box 120, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 120

MANAGER.—A good, live, energetic, capable man of experience wanted to manage a large Independent telephone system in the West. Must be able to invest not less than \$10,000 in the company. Address Box 102, THE AMERICAN TELEPHONE JOURNAL, No. 116 Nassau street, New York City. 102

POSITION.—Wanted, a position as manager, purchasing agent or both, with an Independent Telephone company. Good references. Am now salesman with large supply house and familiar with all factory costs. Can save you money on your purchases. No objection to location. Can accept Feb. 1. Will consider an offer as salesman of electrical supplies. Address, Box 124, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 124

WANTED.—Position by man with fourteen years' experience, good practical, as well as theoretical, knowledge of the business; associated the past four years with one of the largest Independent companies in the country. Would accept a position in the engineering department of a manufacturing company. Good circuit man and have had installing experience. Territory west of Chicago preferred, and contract required. References given. Address, Box 132, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 132

POSITION.—An energetic, tactful, diligent young man of executive ability, with practical experience in telephone work, and an eastern technical education, wishes to again enter the telephone field in the East, Middle West, or South. Has for the past year been engaged in business in New York City in a work allied to Telephony. Would accept a position as manager of a plant of four or five hundred subscribers, and could please patrons and give results; or would connect himself in any capacity he was qualified to fill, with a telephone corporation. Address, Box 126, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 126

Did you ever try the experiment of buying your Poles ahead of time?
It's even more successful than doing your Christmas shopping a month ahead.

Not only are you unburied and able to wait a few days for cars:—you have more time to “shop around,” before you finally decide to buy, of us.

We appreciate the trade that comes to us after such investigation, and, what means more to you, we **KEEP** such customers.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

“From the Stump to the Line”

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

PRODUCERS AND WHOLESALERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building, **CHICAGO, ILL.**

C. J. HUEBEL CO.

MENOMINEE, MICH.

<p>YARDS:</p> <p>MENOMINEE, - MICH.</p> <p>NATHAN, - MICH.</p> <p>STAGER, - MICH.</p> <p>SWANSON, - MICH.</p>	<p>Producers and Wholesalers of</p> <p>IDAHO CEDAR POLES</p> <p><i>45 FEET AND LONGER</i></p> <p>MICHIGAN WHITE CEDAR POLES</p> <p><i>ALL LENGTHS</i></p>	<p>WE HAVE</p> <p>25,000 POLES</p> <p>CONCENTRATED</p> <p>AT OUR</p> <p>MENOMINEE YARD</p>
----------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.

SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.

MENOMINEE, MICH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

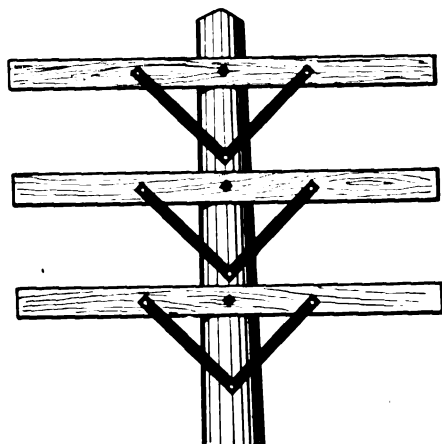
AND THERE ARE MANY OTHERS

**THE FRANKLIN ROLLING
MILL AND FOUNDRY CO.**

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

PRODUCERS NOT JOBBERS

CEDAR POLES

LOWEST PRICES
IN CARLOAD LOTS

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 S. GREEN ST. CHICAGO.

Cedar Poles

Large Stock

Prompt Ship-

ment.



LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.
CEDAR POLES
We aim to please. Try us with your Order.

Attractive Prices
Prompt Dispatch
Good Quality...

TIES { **YELLOW PINE STOCK.**
100,000 6" x 8" x 8 FEET.
Chestnut and Oak, large
stock, standard sizes.

POLES { (Southern White Cedar) long
leaf Yellow Pine, octagonal
and square, Chestnut and
Cypress,
YELLOW PINE CROSS ARMS,
PINS AND BRACKETS.

Manufactured by
EGGLESTON LUMBER CO.,
29 Broadway, NEW YORK.

Prompt deliveries from stock, New York
city yard, or direct from mills.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

Linemen's Outfits
Construction Tools



THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet.

74 CORTLANDT STREET,

NEW YORK CITY

Oak Insulator Pins and Brackets

Direct from North Carolina's immense
Forest to you.
Orders filled at once: no delays, no "cuss-
ing." **TRANSPPOSITION PINS**, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

The Morse
Cedar
Co.
CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.
Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.
POLES
Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines
POLES
YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.
**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.

J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

ELECTRICAL ENGINEER
AND CONTRACTOR
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE

DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candeo Weather-Proof Wire
SOLE MANUFACTURERS
353 BROADWAY, NEW YORK

WILLARD L. CANDEO, } Managers
H. DURANT ORSHVIER, }

GEO. B. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

SIGNS OF THE TIMES.—

The American Telephone Journal is growing better with each issue. Yet the price still remains the same, 52 issues for 100 cents. Hadn't you better send a dollar now?

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.

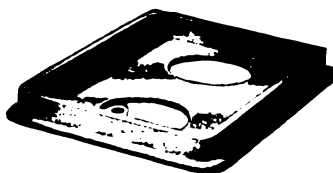


LOUIS M. PIGNOLET

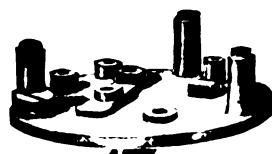
Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

These Pieces Were Not Turned, Bored, Reamed, or the Gears Cut---



each piece was made complete in one operation and they are ready for assembling without further work.



Each piece consumed a couple of seconds, or so, in its making. They are "Die Castings" from Franklin. They are cast in steel dies and they are accurate down to .001 of an inch and every one alike.



Your round-about-way of machining can be done away with by using Franklin Castings.

May we send you a couple of examples of the work?

Franklin Mfg. Company

200 S. Geddes St.

SYRACUSE, N. Y., U. S. A.

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects.

Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

A B C of the Telephone.....\$1.00 By J. E. Homans.	The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
Diagrams of Electrical Connections......50	Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
Induction Coils.....\$1.00 By H. S. Norrie.	Practical Electrics. This volume could rightly be called an Electric Encyclopedia......75
Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	Systematic Treatise on Electrical Measurements.....\$1.00 By H. C. Parker.
Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	Electrical Catechism.....\$2.00 By George D. Shepardson.
Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	American Telephone Practice.....\$3.00 By Kempster B. Miller.
The Electric Telephone.....\$6.00 By G. B. Prescott.	How to Make and Use the Telephone.....\$1.00 By George H. Cary.
The Inspector and Troublemaker.....\$1.00 By A. E. Dobbs.	The Telephone......50 By Prof. A. E. Dolbear.
Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	The Telephone, the Microphone and the Phonograph..... By Count Dumoncel.
Practical Features of Telephone Work......75 By A. E. Dobbs.	Practical Information for Telephonists..... By T. D. Lockwood.
The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	Elementary Treatise on Electric Batteries.....\$2.50 By A. Nianet. Translated by L. M. Fishback.
Small Accumulators......50 By Percival Marshall.	Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	Conduits for Telephone Work......50 By Arthur Vaughan Abbott.
Induction Coils.....\$1.00 By G. E. Bonney.	Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	Patents and How to Make Money Out of Them.....\$1.25 By W. B. Hutchinson.
Electric Instrument Making for Amateurs......50 By S. R. Bottone.	Wireless Telegraphy.....In Press. By C. H. Sewall.
Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
The Telephone.....\$1.00 By William J. Hopkins.	A Practical Guide to the Testing of Insulated Wires and Cables .....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal

116 Nassau Street,
CITY OF NEW YORK



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 15 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S
(Patent)

**CONNECTORS
AND
TERMINALS**

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Eccleston Lumber Co., New York.
Elkin Machine Co., Elkin, N. C.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.

Eccleston Lumber Co., New York.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.

Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.

Michigan Cedar Co., Bay City, Mich.

Morse Cedar Co., Saginaw, Mich.
Pacific Coast Pole Co., Spokane, Wash.

Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

ADVERTISERS' DIRECTORY—Concluded.

Sand Point Cedar Co., Sand Point, Idaho.
 Sterling, W. C., & Son, Monroe, Mich.
 Townsend Cedar & Supply Co., Chicago, Ill.
 Valentine-Clark Co., Chicago, Ill.
 Wisconsin Timber & Land Co., Mattoon, Wis.
 Worcester, C. H., Co., Chicago, Ill.

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Shaw-Walker Company, Muskegon, Mich.
 Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARD DROPS.

Columbia Electric Co., McCordsville, Ind.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Conn. Tel. & Electric Co., Meriden, Conn.
 Ericsson Telephone Co., N. Y.
 Holtzer-Cabot Elec. Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.
 Fahnstock Transmitter Co., New York.
 Holtzer-Cabot Electric Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Telephone Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Barr, W. J., Mfg. Co., Cleveland, Ohio.
 Bissell Co., The F., Toledo, O.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Chicago Writing Machine Co., Chicago, Ill.
 Columbia Electric Co., McCordsville, Ind.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnstock Transmitter Co., New York.
 Holtzer-Cabot Elec. Co., Brookline, Mass.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Leslie A. C., & Co., Montreal, Can.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 North Electric Co., Cleveland, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 McIntire Co., C., Newark, N. J.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
 Bissell Co., The F., Toledo, O.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 National Wire Corporation, New Haven, Conn.
 Okonite Co., New York.
 Roebbing's Sons Co., John A., Trenton, N. J.
 Scovill Mfg. Co., Chicago, Ill.
 Standard Underground Cable Co., Pittsburg, Pa.

Bituminized Fiber Conduit

—FOR—

UNDERGROUND CONSTRUCTION

ELECTROLYSIS-PROOF

WATER-PROOF

A Smooth Laminated Insulator of Unchanging Durability

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate.

The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty percentum of freight and handling charges and twenty percentum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths.

Bends of all angles.

For illustrated book and information apply to

American Conduit Co.

170 Broadway, New York, N. Y.

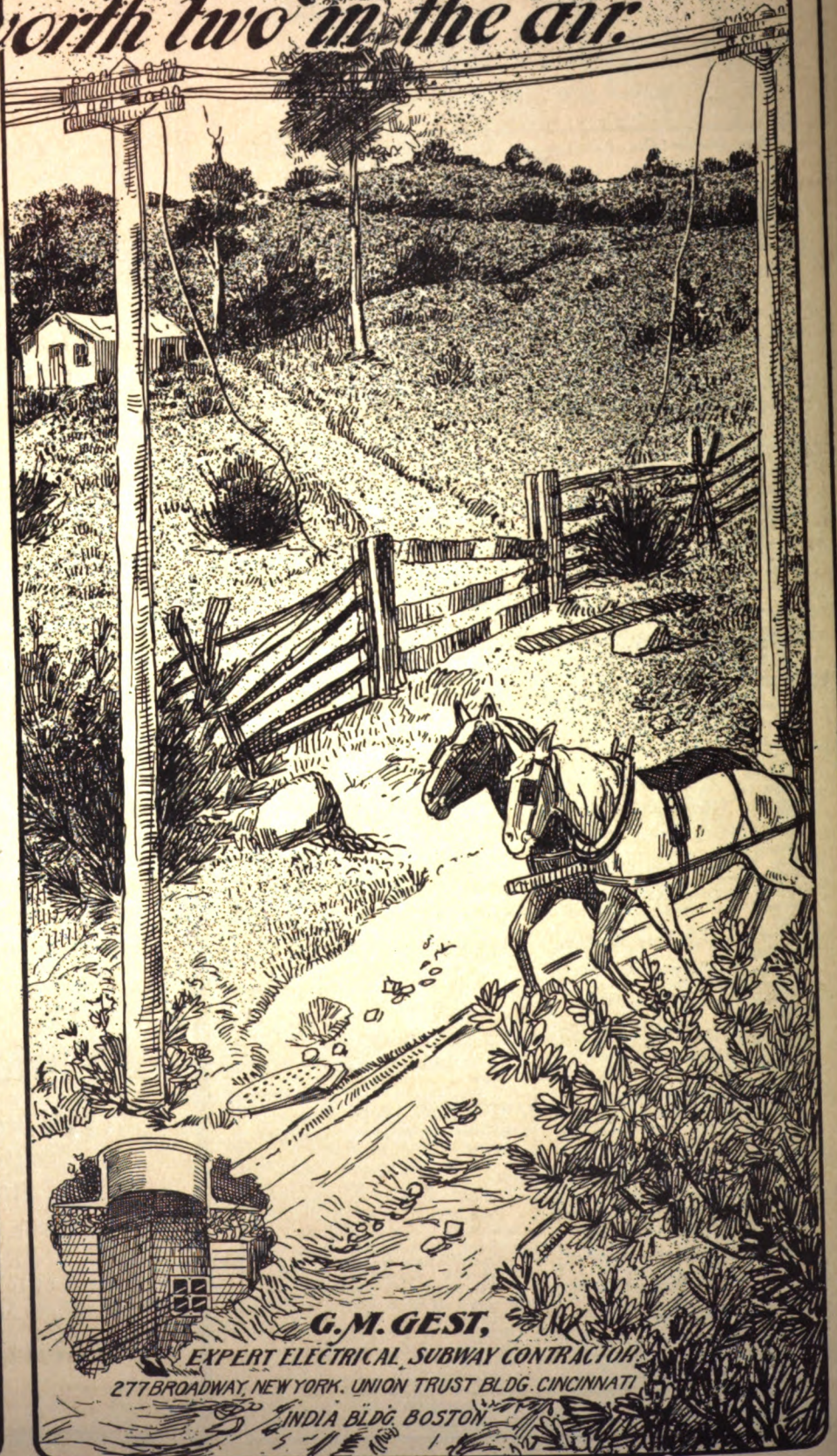
336 Macy Street
Los Angeles, Cal.

822 Manhattan Bldg.
Chicago, Ill.

or to any of the offices of the

Western Electric Company

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,

EXPERT ELECTRICAL SUBWAY CONTRACTOR

277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI

INDIA BLDG. BOSTON

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

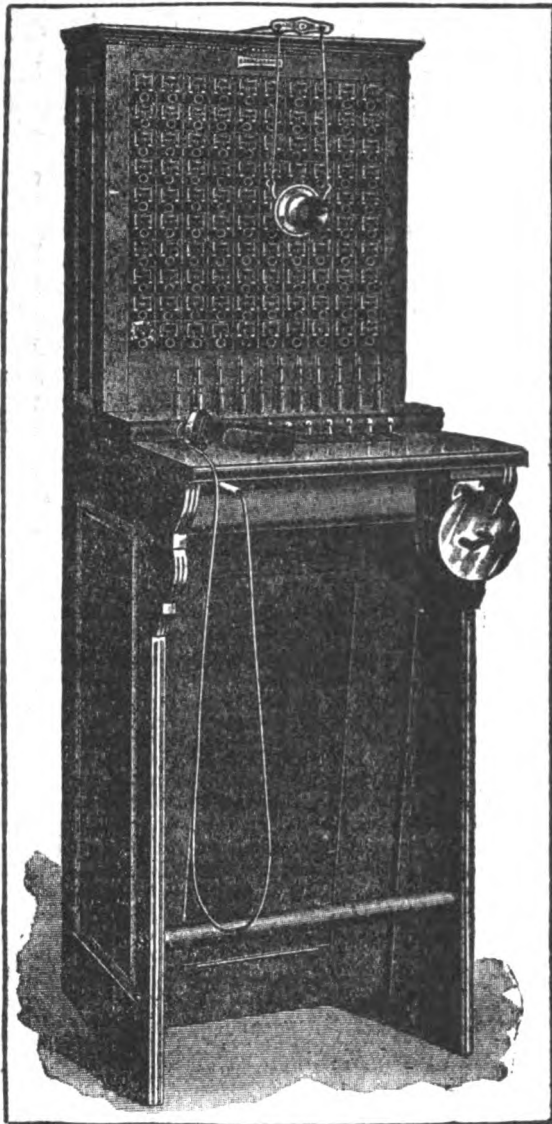
Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

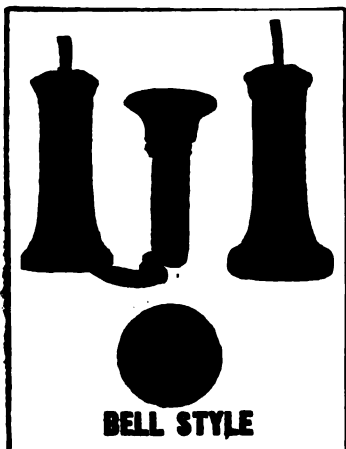


250,000

American Express Drops In Use

There Must Be a
Reason For It

WE MAKE OTHER GOOD THINGS



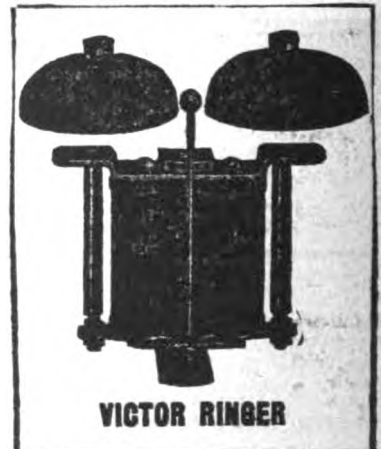
BELL STYLE

**NEW
CATALOGUE**



AMERICAN BEAUTY

**NEW
CATALOGUE**



VICTOR RINGER

American Electric Telephono Co.

CHICAGO

THE AMERICAN TELEPHONE JOURNAL

A Personal Interest===

It is our desire to have everyone in the telephone industry take a personal interest in the American Telephone Journal. A majority already do. See letter:

"Your paper is the best educator in the telephone world, and if all feel the way I do they take a personal interest in seeing the Journal always ahead."

A. F. ADAMS, Mgr.,
Waushara Telephone Co.,
Berlin, Wis.

We allow our subscribers every opportunity for suggestions as to how the Journal can be bettered. Another reason why it leads all.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—FEBRUARY 6, 1904—CHICAGO Number 6

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

THE PASSING OF THE AERIALBy George Van Cowe

THE KANSAS INDEPENDENT CONVENTION

A TESTING TABLE CIRCUITBy George Grove

INDIANA MANAGERS MEET

TELEPHONE CABLES WITH IRON CORES

The Operating Field:

IMPROVEMENTS AT OSKALOOSA
HER INTENTIONS WERE GOOD
UNITED STATES LONG DISTANCE LINES
A HOME-MADE RECEIVER
USE OF RURAL HIGHWAYS
DOINGS AT OGDEN, UTAH

INTERNATIONAL ELECTRICAL CONGRESS ANNOUNCEMENT
THE COMPANY SOLD OUT TO THE BELL
PAYNE'S ORDER BRINGS POSTMASTER TO WASHINGTON
THE CENTRAL UNION GETS AN ULTIMATUM
A PHANTOM CIRCUIT
THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 96.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or Special Articles of Brass, Copper, German Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

The best illustration of that time worn saying "Money talks" is found by spending a few more cents per phone and getting our "Eaco Telephones that talk."

A talkative talker in every sense and the few cents extra investment is readily discernible to the man who knows "points" in telephones. The transmitter and receiver are important points, but there must be something back of them, and the added cost over "cheap" telephones is found not only in the two talkative points but also in the backing—thus do we multiply the talk. Look in the battery box and you find 1900 dry batteries.

Short, crisp pointlets from our telephone typewriter will aid in the digestion of the thought of "paying more." Correspondence suggested.

ELECTRIC APPLIANCE COMPANY, CHICAGO

COOK PROTECTORS STANDARD



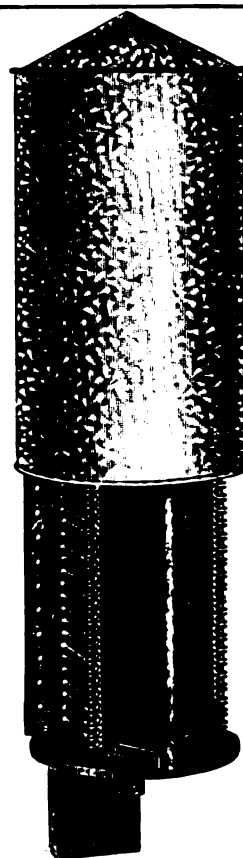
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

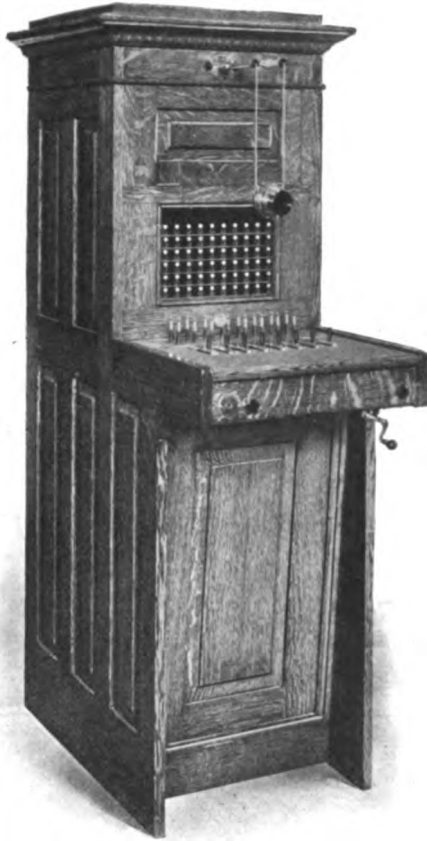
CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

CENTRAL ENERGY SWITCHBOARDS

20 to 18,000 Lines Capacity

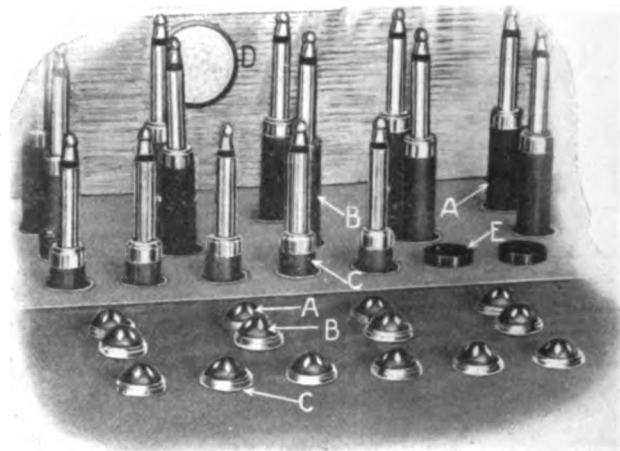


The accompanying illustration shows one of our standard 60 line lamp signal switchboards known as Cabinet No. A-959. These small boards have all the modern improvements possessed by our large switchboards.

The workmanship is of course the very best.

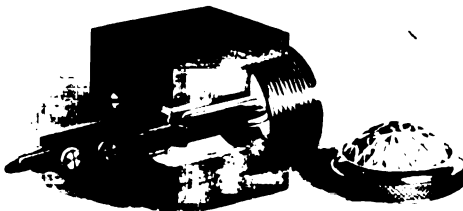
The design of the various parts has been worked out so carefully that it is not at all difficult to maintain a board of this type. The operation is so simple that it is no more difficult to operate than an ordinary magneto drop switchboard.

When the quality of the service that this type of board will give is considered the cost of operating is a very small item.



PLUGS AND SUPERVISORY LAMPS.

- A—Answering plugs and associated supervisory lamp signals.
- B—Calling plugs and associated supervisory lamp signals.
- C—Plug ended transfers and associated lamp disconnect signals.
- D—Pilot lamp. E—Plug hole stops.



PILOT LAMP—showing method of mounting.



PILOT LAMP AND LAMP JACK (Parts).

We have published a Bulletin on Central Energy Switchboards that contains an immense amount of information as well as illustrations of the finest switchboards put on the market. Mailed to telephone companies upon request.

Write for Bulletin No. 8-B.

Stromberg-Carlson Telephone Mfg. Co.

Gen'l & Eastern Sales Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.

Get a Pendent

Not Long Ago

The telephone—the ordinary wall type—was a novelty; soon it became a convenience and luxury; and shortly thereafter a real necessity, while the desk phone succeeded as the luxurious type.

AND NOW

The Pendent Telephone

has superseded both, as a necessity combining the perfection of convenience and the consummation of luxury with elegance, efficiency, readiness and adaptability. And it costs no more than a desk set.

ASK FOR IT

WRITE FOR DESCRIPTIVE MATTER

The Vought-Berger Company

Makers of High Grade Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN



All Right for Quality

Well Balanced Equipment

**TELEPHONES
THAT NEVER
WEAR OUT**

TRY ME

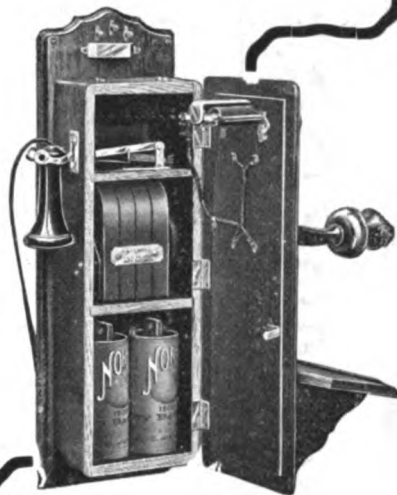
**WRITE
TO-DAY**

**THE
NORTH
ELECTRIC
CO.**

CLEVELAND,
OHIO, U. S. A.

156 St. Clair St.
166

C N 160



No. 10

**ORIGINATED
BY US**

Fitted with our celebrated No. 30 Transmitter, Roller-Bearing Switch Hook and Self-Contained Strap Key.

The best telephone ever devised for private lines, or for school, hotel and residence systems.

**WRITE US
FOR
BULLETINS**

**NEW ENGLAND'S
LEADING
TELEPHONE
MANUFACTURERS**

S. H. COUCH COMPANY

162 Pearl Street

Boston, Mass.

INTERNATIONAL Telephone Mfg. Co.

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**

CHICAGO, ILL.

Multiple Switchboards

T
E
L
E
P
H
O
N
E
S

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

T
E
R
M
I
N
A
L
S

PROTECTIVE DEVICES



The Survival of the Fittest

Takes place in every city or town where two telephone companies compete for patronage. That company which gives the best service will survive. The best telephone service in the world to-day is Automatic, and we installed the exchanges which give it.

From these facts draw a moral.

Automatic Electric Co.

CHICAGO, U. S. A.

Dangers in Telephoning

THE TELEPHONE MOUTHPIECE IS A RECEPTACLE FOR
Dust, Dirt and Disease Germs

Telephonine
TRADE MARK

AND THE ANTISEPTIC ATTACHMENT FOR TELEPHONES IS
THE ONLY ABSOLUTELY EFFECTIVE DEVICE IN EXISTENCE.

IT KEEPS THE DUST AND DIRT OUT

AND THE MOUTHPIECE DISINFECTED, DEODORIZED AND
CLEAN.

THE TELEPHONINE ANTISEPTIC PAD IN THE INSIDE OF
ATTACHMENT VAPORIZES AND CONDENSES OVER THE IN-
SIDE OF MOUTHPIECE AND KILLS THE GERMS BY DIRECT
CONTACT.

The attachment is a necessity not only because it protects health but on the
grounds of cleanliness as well. It is easily attached and can be put on
any mouthpiece.

**Both the attachment and bottle of
TELEPHONINE complete for \$1.00**

Special inducements to Telephone Companies who will equip their 'phones
with this attachment.

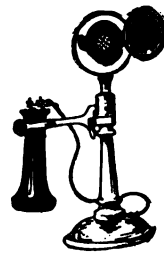
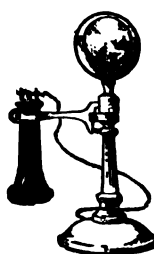
Attractive and profitable propo-
sition to active, intelligent, and
bright men who will act as agents
either all of their time or their spare
time.

Address

**West Disinfecting Co.
Incorporated**

26 East 59th St., New York

The largest manufacturers of disinfect-
ants and disinfecting appliances in
America.



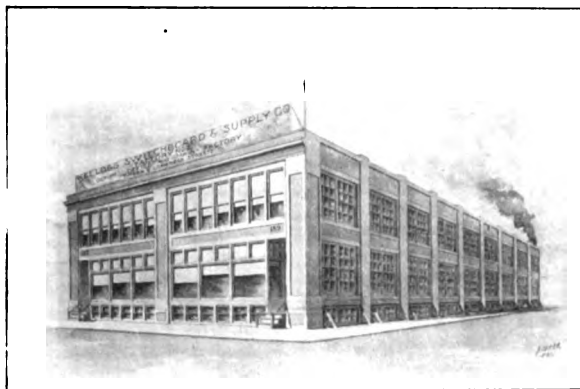
"Send for TELEPHONINE Booklet"

Kellogg Switchboard and Supply Company

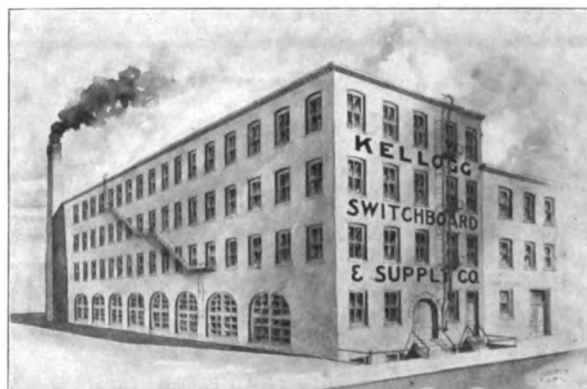
CHICAGO, ILL.



MAIN FACTORY AND GENERAL OFFICES,
CONGRESS AND GREEN STREETS.



FACTORY NO. 2.



GENERAL WAREHOUSE.

The Kellogg Switchboard and Supply Company have just rented and equipped Factory No. 2 with 34,000 square feet of new floor space. This space, together with our main factory, is entirely devoted to switchboards and telephones. We have also increased our warehouse capacity to 35,000 square feet, and have filled same with a complete stock of our standard make of telephones. Our entire plant equipped throughout with modern machinery and manned by the most expert mechanics affords unexcelled facilities for the manufacture of the highest grade of telephone apparatus.

Our increased factory capacity enables us to make everything not in stock at very short notice. We are prepared to fill from stock all orders for telephones of standard types. Orders for magneto or common battery switchboards will be filled with unusual despatch.

We manufacture no inferior grades. Our apparatus as to quality, durability and beauty will be strictly maintained. Write for prices.

**KELLOGG SWITCHBOARD and SUPPLY COMPANY,
CHICAGO**

346 Broadway
New York

Electric Building
Cleveland

Keystone Telephone Building
Philadelphia



MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

TELEPHONE
INSTRUMENTS

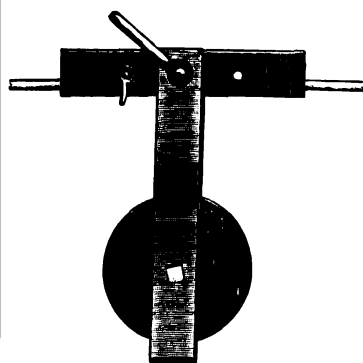


TELEPHONE
SUPPLIES

PALACE OF HORTICULTURE

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus
Dealers in "Everything Used with Telephones" **909 Market Street, St. Louis, U.S.A.**

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



"Ready" Cable Trolley

Patented Dec. 15, 1903

Cable can be put in place in $\frac{1}{2}$ the time and expense, as compared with old method of stringing cable.

Secure our prices before buying cable and telephone supplies.

THE W. G. NAGEL ELECTRIC CO.

416 Huron Street

TOLEDO, O.

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Electric Appliance Co..... 3	Klein, Mathias, & Sons..... 33	Roebbling's, John A., Sons Co.... 11
American Electric Teleph. Co.... 40	Elkin Machine Co..... 33	Leslie, A. C., & Co..... —	Sand Point Cedar Co..... 30
Am. School of Correspondence... 12	Ericsson Telephone Co..... 10	Lindsley Brothers Co..... 30	Scovill Mfg. Co..... 2
American Vitrified Conduit Co... 39	Fahnestock Transmitter Co..... 33	McIntire, C., Co..... 36	Shaw-Walker Co..... —
Automatic Electric Co..... 6	Field, C. J..... 36	Maltby Lumber Co..... 29	Standard Underground Cable Co. —
Barr, W. J., Mfg. Co..... 12	Fowler, John H..... 32	Michigan Cedar Co..... 33	Stanton, L. W..... 34
Beidler, Francis & Co..... 33	Franklin Mfg. Co..... 35	Middleton, J. W., & Co..... 34	Sterling, W. C., & Son..... 33
Bissell Co., The F..... 9	Franklin Rolling Mill & Fdy. Co. 31	Miller Anchor Co..... 30	Sterling Electric Co..... 6
Butterfield, J. F..... 34	Gest, G. M..... 38	Monarch Telephone Mfg. Co..... 8	Stromberg-Carlson Telephone Mfg. Co. —
Camp, The H. B. Co..... 39	Hemingray Glass Co..... —	Morse Cedar Co..... 33	Swedish-American Tel. Co..... 12
Central Mfg. Co..... —	Holtzer-Cabot Electric Co..... —	Nagel, W. G., Electric Co..... 9	Telephone Printing Co..... 33
Central Telephone & Electric Co. 8	Huebel, C. J., & Co..... 29	National Wire Corporation..... 11	Townsend Cedar & Supply Co.... 34
Chicago Insulated Wire Co..... 33	Hyde, W. H., & Co..... 34	New Haven Novelty Machine Co. 2	Valentine Clark Co..... 30
Chicago Writing Machine Co..... —	Illinois Electric Specialty Co.... 10	North Electric Co..... 5	Vought-nerger Co..... 5
Cohn & Bock..... 33	Imperial Finance & Cons. Co.... 34	Nungesser Electric Battery Co.... —	Wanted, Situations, etc..... 96
Columbia Electric Co..... —	Ingram-Richardson Mfg. Co..... 12	Okonite Company..... 34	West Disinfecting Co..... 6
Connecticut Teleph. & Electric Co. —	Index of the Technical Press..... —	Pacific Coast Pole Co..... 30	Western Electrical Instrument Co. 33
Cook, Frank B..... 3	Inland Steel Co..... 34	Pignolet, L. M..... 35	Wisconsin Timber & Land Co.... 34
Couch, S. H. Co..... 5	International Telephone Mfg. Co. 5	Pittsburg & Lake Superior Iron Co. 29	Worcester, C. H., Co..... 29
Crumb, W. H. Co..... 34	Kellogg Switchboard & Supply Co. —	Pittsburg Sewer Pipe & Conduit Co. —	Yeshera Mfg. Co..... 11
Cunningham Iron Co..... 36	Co..... 7, 32	Cable Sleeves.	
Dickey Clay Mfg. Co., W. S..... 36	Bissell Co., The F., Toledo, O.	Nagel, W. G., Electric Co., Toledo, O.	Cunningham Iron Co., Boston, Mass.
ANTISEPTIC ATTACHMENT.	Chicago Insulated Wire Co., Chicago, Ill.	New Haven Novelty Machine Co., New Haven, Conn.	Field, C. J., New York.
West Disinfecting Co., N. Y.	Kellogg Switchboard & Supply Co., Chicago, Ill.		Gest, G. M., Cincinnati, O.
BATTERIES.	Nagel, W. G., Electric Co., Toledo, O.	CARD INDEX SYSTEMS.	Nagel, W. G., Electric Co., Toledo, O.
Electric Appliance Co., Chicago, Ill.	National Wire Corporation, New Haven, Conn.	Shaw-Walker Co., Muskegon, Mich.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.
Illinois Electric Specialty Co., Chicago, Ill.	Okonite Co., New York.		W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Nungesser Electric Battery Co., Cleveland, O.	Roebbling's Sons Co., John A., Trenton, N. J.	CLIMBERS.	
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Standard Underground Cable Co., Pittsburg, Pa.	Klein & Sons, Mathias, Chicago, Ill.	CONNECTORS.
BONDS.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	Cook, Frank B., Chicago, Ill.
J. W. Middleton & Co., Chicago, Ill.	CABLE HANGERS.	CONDUITS.	McIntire Co., C. Newark, N. J.
BRASS.	Bissell Co., The F., Toledo, O.	American Conduit Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.
Scovill Mfg. Co., Chicago, Ill.	Cook, Frank B., Chicago, Ill.	American Vitrified Conduit Co., New York.	CONSTRUCTION SUPPLIES.
BOOTHES.	Nagel, W. G., Electric Co., Toledo, O.	Camp Co., The H. B. New York.	American Electric Tel. Co., Chicago, Ill.
Yeshera Mfg. Co., Toledo, O.	Standard Underground Cable Co., Pittsburg, Pa.		Electric Appliance Co., Chicago, Ill.
CABLES.			Franklin Mfg. Co., Syracuse, N.Y.
American Electric Tel. Co., Chicago, Ill.			

WANT AND FOR SALE ADVERTISEMENTS, PAGE 96.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

Telephone Cable on Hand

Quantity	Length	Pairs	Gauge	Wrapping	Capacity	Lead	Tin
1	300 ft.	20	20	D. W.	.10	$\frac{3}{32}$	No
1	70 ft.	50	20	D. W.	.10	$\frac{1}{8}$	No
1	365 ft.	100	22	D. W.	.12	$\frac{7}{16}$	No
1	125 ft.	150	22	D. W.	.10	$\frac{1}{8}$	1%
1	600 ft.	150	22	D. W.	.12	$\frac{3}{32}$	No
1	416 ft.	200	20	D. W.	.10	$\frac{1}{8}$	No
1	291 ft.	300	20	D. W.	.10	$\frac{1}{8}$	3%

**Shipments
made from
Toledo stock.**

Write for Prices

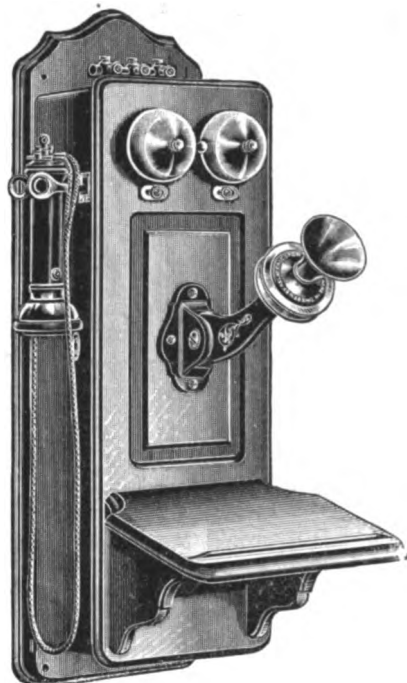
1—length 5000 feet, on one reel, Extra High Strength, Steel Strand $\frac{1}{4}$ in., double galvanized, per C feet, \$5.50.

After a most strenuous effort we have succeeded in getting just a little ahead of orders on our No. 19 Green and Black Duplex.

THE F. BISSELL COMPANY.
TOLEDO, O.

Cheaply Maintained

EFFICIENT—DURABLE



Ericsson telephones meet the demands of an exacting Public, for the best—and will do all that is claimed of them.

Write for
Illustrated
Booklet

**Ericsson
Telephone
Co.**

Strictly
Independent

Manufacturers and Importers of Telephones
and Telephone Supplies for Magneto
and Common Battery

296 Broadway, New York, N. Y.

ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

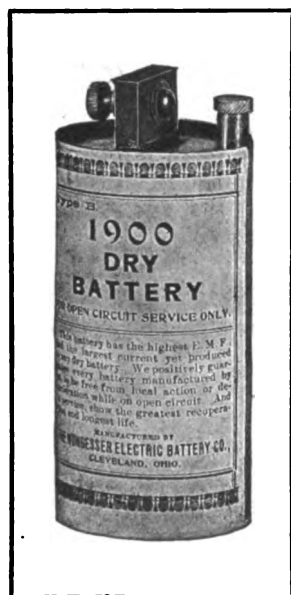
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

*Complete Stock
Always on Hand*

ILLINOIS ELECTRIC CO., 239 and 241 MADISON ST.
CHICAGO, ILL.

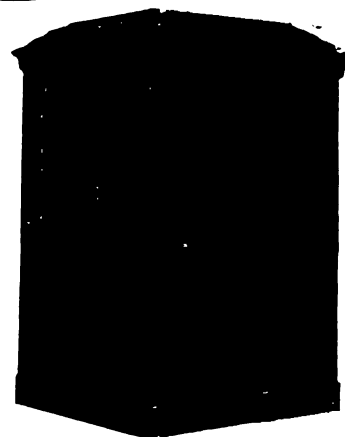
Distributors of Telephone Supplies and Construction Material

PERFECT BOOTHS

need Perfect facilities. We've got 'em. Better than any one else on earth. Result: We turn out **BETTER BOOTHS** for **LESS MONEY** than any one on earth.

YESBERA MFG. CO.,
TOLEDO, OHIO.

Write for Catalogue and Prices.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO

**Insulated
Electrical
Wires and Cables**

R DEBLING

**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.
TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

Agencies and Branches
**CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

YOU WILL FIND



SWEDISH AMERICAN APPARATUS

ALL OVER

THE COUNTRY

*There's a
Reason.*

Get our Prices and Descriptive Matter.

SWEDISH-AMERICAN TELEPHONE CO., Chicago, Ill.



All the big Companies
use them!

ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON M'FG CO.
BEAVER FALLS, PA.



**A
256
Page
Book on
ELECTRICITY**



70c

by express
(prepaid)

Page 7x10 in.
On Enameled Paper
Bound in Green Buckram

MANY people believe that Electricity cannot be taught outside the class room. To demonstrate the standard, scope and methods of our instruction we have bound up four representative text books in our Electrical Engineering course in a handsome linen cover under the title of

PRACTICAL LESSONS IN ELECTRICITY

and will send one copy for seventy cents (the cost of binding and express charges) to every reader of the AMERICAN TELEPHONE JOURNAL sending us the names of two friends interested in Engineering. (Address Room 9H)

The book is easily worth \$2.00, and we make this liberal offer because we know that an inspection of our text books will be convincing evidence of the practical value of our instruction. The subjects embraced are:

STORAGE BATTERIES by Prof. F. B. Crocker, Columbia University: Types; General Principles; Chemical Action; Data Sheets; Edison Storage Battery; Charging; Efficiency; Troubles and Remedies; Testing; Portable Batteries for Automobiles and Boats, etc.

ELECTRIC WIRING by H. C. Cushing, Jr., author of "Standard Wiring": Dynamo Installation; The Switchboard; Motor Installation; Tables; Transformers; Three-Wire Systems; Poles and Pole Setting; Inside Wiring; Arc Light Wiring; Conduit Work; Fixture Wiring; Cut-Outs, Switches; Arc and Incandescent Systems; Fuses; Inspection, etc.

ELECTRIC CURRENT by L. K. Sager, S. B.: Volt, Ampere, Ohm; Resistance, Conductivity; Tables; Circuits; Grouping of Cells; Quantity; Energy; Power; Coulomb; Joule; Watt; etc.

ELEMENTS OF ELECTRICITY by L. K. Sager, S. B.: Experiments with Magnets; Conductors and Insulation; Leyden Jar; Voltaic Cell; Types of Cells; Electromagnets; Induction Coil; Electrotyping and Electro-Plating; The Telephone; The Telegraph; Sounder, Alphabet, Key, Battery, Relay, etc.

Illustrated 200 page quarterly Bulletin giving full outlines of several different courses in Engineering (including College Preparatory) will be sent with each book.

AMERICAN SCHOOL OF CORRESPONDENCE
at Armour Institute of Technology, Chicago, Ill.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND

The American Telephone Journal

New York City, 116 Nassau Street

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, FEBRUARY 6, 1904

NUMBER 6

THE PASSING OF THE AERIAL

BY GEORGE VAN COWE.

IT does not need the memory of the oldest inhabitant to vividly recollect the time when New York streets were literally covered with forests of poles, heavily burdened with scores of cross arms on which depended a cob-web of circuits that, encumbered with the wrecks of primeval kites, literally darkened the sky and actually shut out light from the adjacent buildings. And probably many will remember the notable crusade of Mayor Grant, who, when the first subways were completed, forced all reluctant electric companies to occupy them by literally, axe in hand, chopping down the objectionable aerial circuits of the reluctant companies. And to-day New York's streets, almost completely freed from the unsightly pole line, are monuments to the courage of the foresight of the early conduit builders and the intrepidity of the Mayor.

The word "almost" is used advisedly, for there are now but two pole lines remaining in any of the well built portions of Manhattan Island. One commences at 82d street and Amsterdam avenue and extends northward from this point to and beyond the Harlem River. The other is the famous West street pole line, which, in its palmiest days, is illustrated in Fig. 2, and was probably one of the most notable as well as the greatest pole line that had ever been constructed. Starting near the lower end of Manhattan Island and carrying all the important long distance circuits connecting Manhattan both with the east and west, the West street line ran along the river front. It was composed of the choicest and heaviest yellow pine sticks, selected with as much care as would be employed in the choice of the mast of a clipper ship, and it towered into the air scores of feet, carrying dozens of cross arms.

Gradually, as experience demonstrated the superiority of underground construction for urban lines, the famous West street pole line has dwindled and the old huge poles have disappeared, and though to-day, as is shown in Fig. 1, it is still a pole line of no mean design, it is but a memory of its former greatness. That it has so long survived the pressure of the advocates of underground cable, is due to the fact that until recently it has been impractical to carry on telephonic conversation through long lines of underground cable. But a few years ago Dr. M. I. Pupin, of Columbia

College, invented a method whereby the capacity of underground cable, which is a factor that previously had prohibited its use in telephony, could be neutralized by the addition of impedance coils to such an extent as to render it possible to put important toll lines in underground circuits.

During the past two or three years, extensive experiments have been in progress whereby the best design and method of arranging the balancing inductances have been tested in actual service, so that now it is considered feasible to apply this method of improving the talking powers of telephone cables to such important circuits as extend over the West street pole line.

So it is reported that the New York Telephone Company has installed an underground cable from downtown to King's Bridge, a distance of about fourteen miles; the New York and New Jersey Company is experimenting with an underground line between New York and Elizabeth, N. J., and two lines on Long Island, and the American Telephone and Telegraph Company is testing overhead wire Pupin lines to Omaha, St. Paul and Boston. The first practical application was the laying of the cable to King's Bridge, which the New York Telephone Company has just completed at an expense of

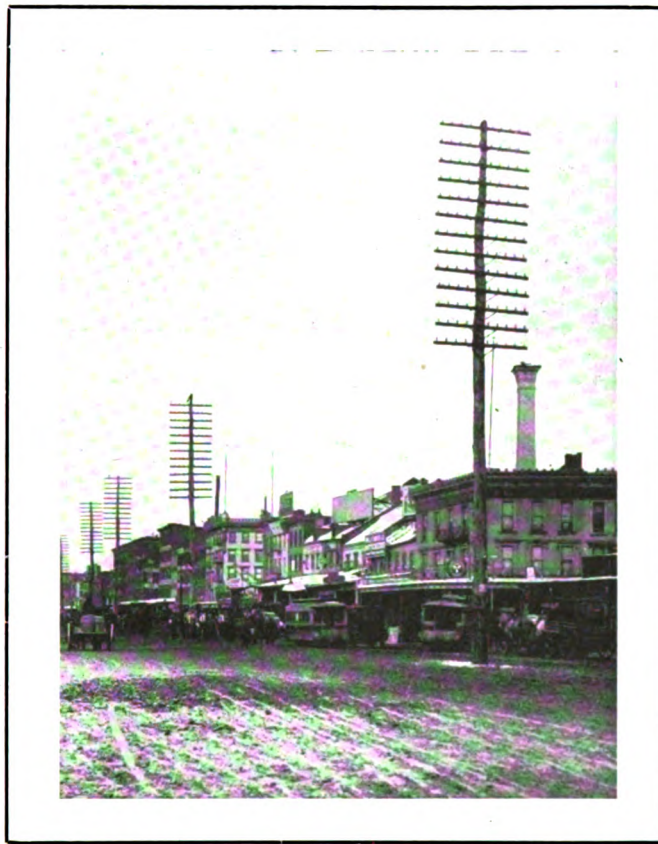


Fig. 1. The West Street Pole Line as it is To-day.

\$200,000. Some of the wires are in use now, and have satisfactorily accomplished the results expected.

"The purpose of this King's Bridge cable," said Chief Engineer J. J. Carty, of the New York Company, "is to enable us to carry a long-distance wire, like the Chicago wire, into the city underground. By the old system, conversation over a long-distance wire like that, if carried underground for that distance, fifteen miles would be impossible. One mile underground has as much cutting down effect on a wire as twenty-eight miles overhead, so ordinarily a fifteen-mile underground stretch at each end of a wire between here and Chicago would equal 840 miles overhead, or practically the whole distance between the two cities.

"In this system the coils are placed at intervals of two miles on each circuit, and by the action of peculiar electrical laws, the current is transmitted without the usual interference. For this reason we hope to conform to the sentiment of the people in regard to overhead wires by doing away with our present long-

distance pole lines on West street, which we will do if the experiment proves a commercial success. The final test is yet to be made, but so far the results have been very satisfactory. I do not mean to say, and do not at all think, that underground transmission, even with the new system, is practicable at the present time for very long distances. For long distances, economically and practically, nothing can compare with the overhead line."

The West street pole line spoken of is the only overhead line of any consequence at all now in existence in New York City, and it runs the full length of Manhattan Island through a very busy section. It carries only toll wires, which before the development of the Pupin system it would have been impossible to place underground. At one time the lead had on it twenty-five ten pin arms, but some time ago this number was cut more than in half and the length of the poles cut down correspondingly. The line has cost the company owning it a great deal to maintain.

There is every reason to believe that the experimental cable here alluded to will prove a success and that the knell which is now sounding for the West street pole line will continue to toll until all of

the overhead lines in our larger cities have vanished underground. Certainly this is the conclusion most to be desired both from a standpoint of reliability and economy of service.

So far the Pupin method is the only one which has received practical demonstration, but it is by no means certain that it is the only way. On the contrary, a decade prior to Dr. Pupin's discovery, Professor S. B. Thompson indicated methods which he advocated as applicable to submarine cables and, if suitable for this purpose, they would be equally valuable for underground cables. No one seems to have had the courage to attack this problem, but, sooner or later, probably, the Independent companies will secure entrance to the largest cities, and it therefore behooves them to take such steps as will enable the construction of circuits suitable for the purpose. The Pupin, it perhaps might almost be said, is not the most hopeful method of solving this problem, but it is vital to the entrance of large cities, and the Independents should lose no time in attacking and solving this problem with the same

progressive spirit that has characterized all of their other introductions and which has made their past so successful.

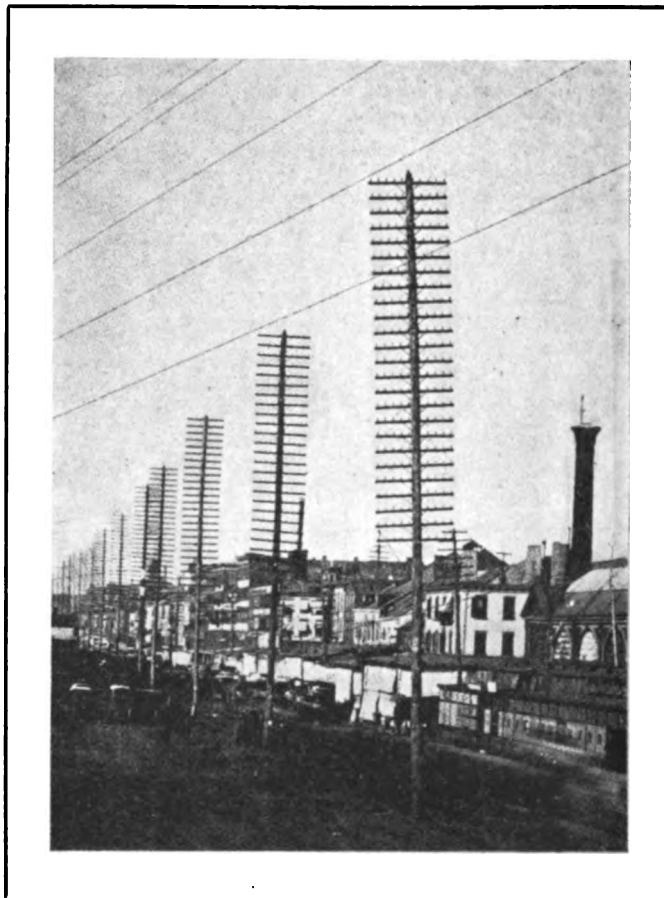


Fig. 2. View of the Old West Street Pole Line Looking East.

THE KANSAS INDEPENDENT CONVENTION

A CONVENTION, the third annual of the Kansas Independent Telephone Association, was held in Topeka on January 28th and 29th. When the convention was called to order by President A. A. Godard on Thursday morning about seventy-five members were present.

The convention opened with an address by President Godard, who spoke on the origin and rapid growth of the telephone business, and the great good which had been accomplished. In his address he discussed the McCann case of Johnson County, in which a telephone company has been enjoined by the supreme court from building a line on a public highway in front of McCann's property. In this case the farmer, McCann, was beaten in district court, but the decision was reversed in the supreme court. The case had been taken up by attorneys for the Independent Telephone Association, said Mr. Godard, and a rehearing of the case had been granted by the supreme court, with the expectation that the case will come up some time in May.

In the McCann case it seems that the farmer objected to a pole being set in front of a gate to his property. The matter was discussed by the members, and it was decided to send a man to Johnson County for the purpose of investigating the case and finding out if an injustice had been done the farmer. It was not the purpose of the association, they felt, to settle the matter, but to see who was at fault and try to have the wrong righted. Mr. Combs, a member who knew of the case and the contending parties, said:

"I don't believe the Johnson County Telephone Company, which is a farmers' organization, put a pole in front of McCann's gate, as charged. He may have made a gate behind the pole after it was set, who knows?" Mr. Combs was delegated to investigate the affair.

At the close of the discussion committees were appointed by the president. J. E. Byers, of Ottawa; W. W. Dilworth, of Beloit; Austin Miller, B. F. Pankey and A. R. Champlain were put on the committee on credentials. The committee on resolutions consists of John Doyle, A. Hodges, Sykes, Valentine and Watson.

A motion was made and carried during the session to request the representatives of various manufacturing concerns who had exhibits in the adjoining rooms to "shut up shop" during the sessions, so that the members might be rounded up to attend.

A great growth of business has taken place since the last meeting a year ago. The Independent connections are all over the State at present.

The present officers of the association are:

A. A. Godard, president.

J. M. Doyle, of Belleville, vice-president.

Chas. E. Wells, of Marion, secretary.

J. W. Smith, of Minneapolis, treasurer.

B. F. Pankey followed with an address regarding the development of the Independent system in the State and in the adjoining States. His talk was devoted especially to Topeka.

Frank L. Brown told of the Independent system in Wichita. He was not present, but his paper was read.

"The Southwest" was the subject talked about by Robert Burns, of Hutchinson. He said the Independent system had more than doubled its business in the Southwest in the past year.

One of the most interesting talks was made by C. L. Brown, of Junction City. He said that Topeka would soon be in connection with Abilene, Junction City, Minneapolis, Beloit and all the intermediate territory. He also stated that within a few months the systems of the East would be connected with the Independent system, that it would be possible to talk to people living in Indianapolis and Cincinnati and intermediate points. When the proposed connections are made with the Topeka exchange there will be more than 6,000 available to Topeka.

In the evening a smoker was held in the Hotel Throop, which was the convention headquarters.

After the election of officers on Friday afternoon, the 29th, the association adjourned. A. A. Godard, of Topeka, was re-elected president of the association and Charles E. Wells, of Marion, will again hold the office of secretary.

Three addresses were delivered during the day, two in the forenoon and one in the afternoon. The subject of James S. Brailey's address was "Long Distance Development," and C. H. Munsell spoke of "Our Relations to the Manufacturer." "Salient Points of Construction in Kansas City" was the subject of the address by W. C. Polk. After the addresses were delivered and until the time for the election of officers the time was taken up with a general discussion of telephony and its development.

A TESTING TABLE CIRCUIT

By WILLIAM GECKLER, JR.

A TESTING table circuit that can be used rapidly and with reasonable accuracy is a necessary adjunct to every telephone exchange. The writer, finding it necessary to design a circuit that would meet such requirements, takes pleasure in submitting it to the readers of THE AMERICAN TELEPHONE JOURNAL.

Referring to Fig. 1, the operator's telephone circuit is multipled to keys A, B, C, D, and 1. A condenser is cut in series with the secondary, which prevents current from flowing through the

the listening key, 2 the reversing key, 3, the grounding key, 4 the ringing key, and 5 the battery key, used for supplying talking battery to subscriber's station. Key 6 is an impedance coil key used for holding supervisory when talking through exchange with test through on a trunk from the test table to the exchange, the subscriber is furnished battery through the cords, which causes the relay that is cut in series on the sleeve side of the cord circuit, to operate and light a supervisory lamp, which remains lighted during conversation. This relay should be of low resistance and it

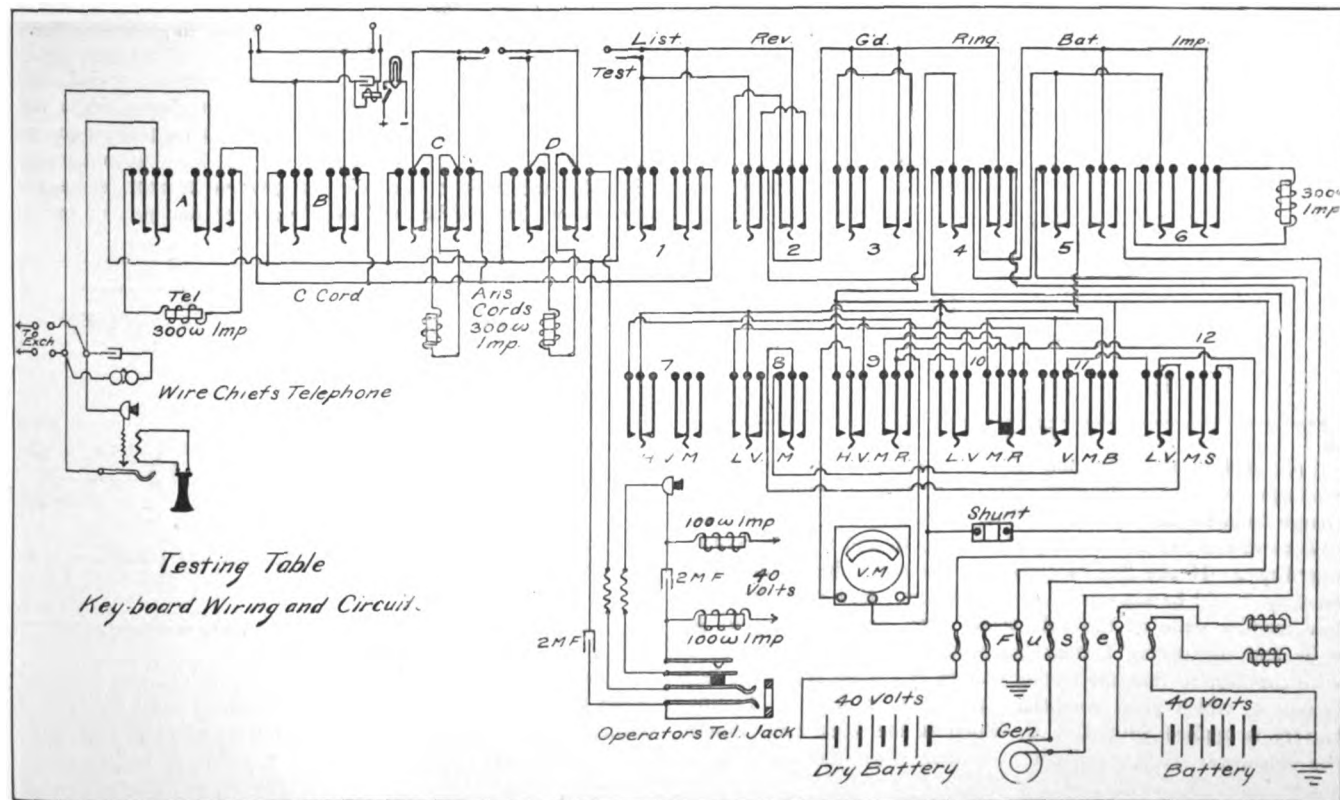


Figure 1.

receiver, thereby making it possible to cut in the listening-key on the test cord when making voltmeter tests. Key A is used for answering calls to wire-chief's telephone. The impedance coil terminating on the outer springs is used to operate the exchange cord supervisory signal. Key B is a listening key that connects with a pair of cords used for giving a subscriber whose line is terminated on a test cord desired connection through the exchange. The subscriber, upon removing the receiver from the hook, causes a signal to appear at the testing table. Upon being plugged

is desirable to connect a condenser in multiple with the relay winding to improve transmission.

Keys C and D are listening keys connected with cords, used to make or answer calls on trunks between test table and exchange. An impedance coil is permanently connected across these cords to hold exchange connection when the listening key is cut out. Keys 1 to 12 inclusive are used with the test cord, Key 1 being cord. It can also be used when a decrease in E. M. F. is required at test cord. For example, when Key 5 is cut in 40 volt battery

is supplied to test cord; if, then, Key 6 is cut in, the E. M. F. will be reduced to about 14 volts.

Keys 7 to 12 inclusive are used for making volt-meter tests. It will be noticed that all tests are first applied to the sleeve or line side of the test cord. Therefore, to test on the tip side of the cord, it is necessary to use the reversing Key 2. A volt-meter having 2 scales can be employed, one scale having a reading of 150 volts and the other reading to 30 volts. Upon cutting in Key 7, which connects in the high reading scale, conditions

Figure 2.

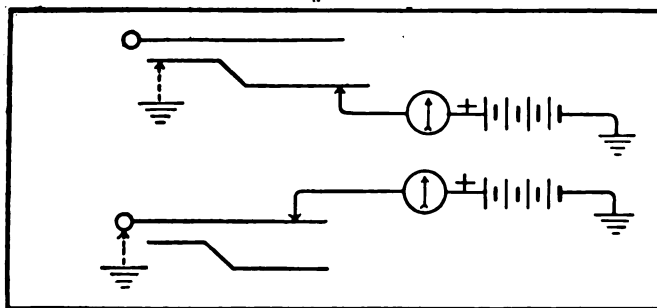


Figure 3.

are set for making volt-meter test for ground on the sleeve or line side of the circuit, as shown in Fig. 2. To make a test for ground on the tip side of the circuit, Key 2 is used with Key 7, conditions are then as shown in Fig. 3. To make a test for a shunted circuit, Key 7 is cut in giving conditions, as in Fig. 2. The negative battery, being grounded, it is then only necessary to ground the opposite side of the testing circuit, which is accomplished by cutting in Key 3, thereby giving conditions as shown in Fig. 4.

Figure 4.

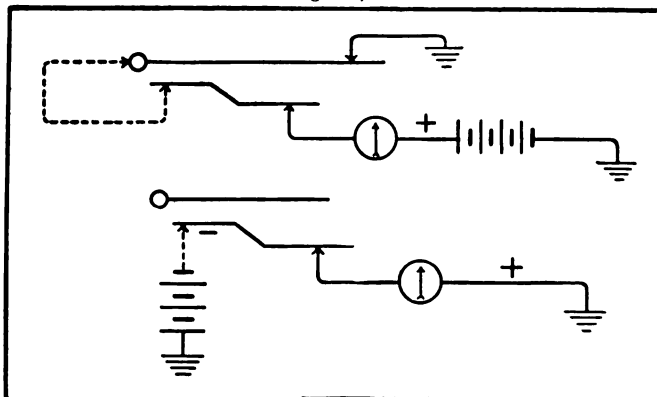


Figure 5.

Upon making the foregoing tests on a subscriber's line and no readings are shown, the next step is to take a condenser discharge from the subscriber's station, which is done by leaving the keys as in the last test and rapidly cutting in and out the reversing Key 2. If the line is closed to the subscriber's station a reading should be shown on the volt-meter. Key 8 employs the low reading scale of the volt-meter. This scale reading to 30 volts and the testing battery being 40 volts, it is necessary to wire the key, so that the testing battery is cut off when the key is cut in, which gives conditions as shown in Fig. 5. Testing battery is applied with Key 12, which at the same time shunts the volt-meter with a resistance, so that, when the test plug is

short circuited, a 30 volt reading is obtained. Conditions in Fig. 5 can also be obtained on the high reading scale by using Key 11 with Key 7. To obtain conditions in Fig. 6, Key 2 is used with key or combination of keys used for Fig. 5.

It frequently occurs that subscribers' lines become crossed with

Figure 6.

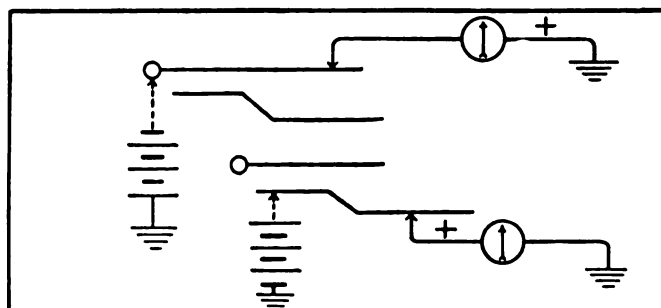


Figure 7.

those carrying foreign currents, such as on telegraph or other lines. Unless a special volt-meter is employed in which the needle stands centrally at zero, thereby allowing it to swing both to right or left, it would be (under some conditions) impossible to take a V. M. reading, therefore Keys 9 and 10. Key 9 reverses the high reading and 10 the low reading scale. In the foregoing all

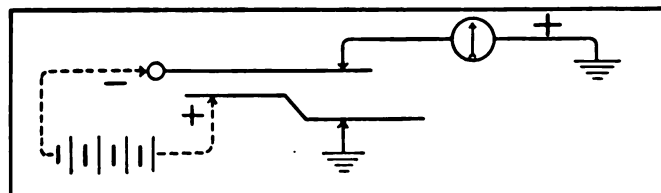


Figure 10.

tests, including Fig. 6, were considered, and to conclude, the writer will give the combination of keys necessary for a few more tests on the high reading scale. To test for positive current on sleeve (Fig. 7), cut in Keys 7 and 9. For like test on tip (Fig. 8), add Key 2. To test for positive current on tip and negative on sleeve (Fig. 9), use Keys 7, 11, and 3. For current

Figure 8.

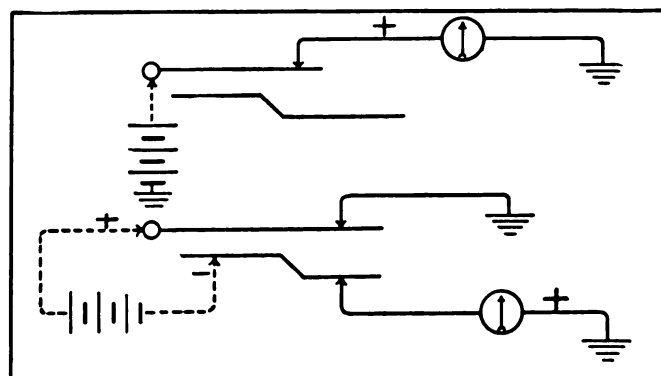


Figure 9.

in opposite direction (Fig. 10), add Key 2. To test for unbalanced line, use Keys 1, 7, and 11, then cut in and out Key 2. A balanced line should have the same degree of noise when Key 2 is cut in or out.

THE CUYAHOGA'S PROFIT SHARING PLAN

By E. C. HOPWOOD, *Special Correspondent.*

AN event of more than ordinary interest took place at the offices of the Cuyahoga Telephone Company, in Cleveland, on Saturday, January 30, when there was distributed to the employees of the company \$4,154.69, the employees' share in the profits of the company for the year.

The announcement that the profit sharing plan was to be tried by the Cuyahoga Company attracted attention not only in the city

but throughout the State and even beyond its borders among the circles of economic students, who argue that the plan is not only feasible, but to the best interests of the employer and the employee. The plan came to the attention of President Roosevelt, and he was so favorably impressed with it that he at once wrote to President Dickson of the Cuyahoga Company, encouraging him to go on with the trial, and asking to be kept informed of its

progress. Another noted man, who was greatly interested in the plan, was President Eliot, of Harvard University. As Mr. Roosevelt said that he hoped the plan would be taken up and followed by large corporations throughout the country, so Mr. Eliot was free in expressing his belief in the benefit that the step would be toward a better relation between employer and employee. He too asked to be kept advised as to its progress.

The plan was put into operation for the last six months of 1903. From the standpoint of President Dickson it has been more than successful. The sum which is added to the income of the various employees amounts to about one-third of one month's salary, or an increase of 6 per cent. for the time in which the scheme has been in operation.

Six months ago when the plan was announced, every employee of the company from the office boy up, received a letter outlining the plan and asking the hearty co-operation of all the employees be accorded to the company that the scheme might be carried out successfully, as there was more than passing significance attached to it both from the standpoint of the company and of those who were watching it from the viewpoint of the political economist. It was announced that the distribution would be 20 per cent. pro rata of the surplus earnings of the company. The employees have given fully the aid that has been asked of them, and the personal interest which has been taken in the work seems to show that the interest of the company is in the heart of every employee.

As an instance of the cordial relations which have existed and

still exist between the president and the employees, the daily press of Cleveland has commented on the following: Last week, when the time for the distribution drew near, President Dickson announced that the books were in shape and sent word to the employees that they were at liberty to name a committee to inspect them to see that no mistakes had been made and that all was fair and above board. The employees did name a committee, but it was not to look over the books. It was to tell President Dickson that the employees placed the utmost reliance on the integrity of the president of the company and its officials, and that it was satisfied that with the system of bookkeeping and auditing in vogue, there would be no reason for an investigation by the employees. There was some little trouble in figuring out the income from the plan to the different employees, but it was finally accomplished in a satisfactory manner.

The company's earnings for 1903 were \$396,490.20; operation and taxes for the year were \$213,960.52; interest charges were \$111,650. Of the surplus the amount earned for the last six months was \$20,773.47, and the 20 per cent for distribution among the employees amounted to \$4,154.69.

At present there is some little doubt whether the plan will be continued for another year, but it seems quite likely. President Dickson feels that the test has been very satisfactory and that another and more complete test would further prove its value. Whether that test will be made lies with the stockholders and was one of the things which was to come up at the annual meeting.

INDIANA MANAGERS MEET

ABOUT twenty-five managers of Independent telephone exchanges, representing Marshall, LaPorte, Kosciusko, Fulton, Starke, St. Joseph, Elkhart, Noble, Pulaski and Berrien County, Mich., responded to the call of Managers J. K. Johnson, of Elkhart, and Theodore Thorwood, of South Bend, and met at South Bend recently to organize an association for the betterment of the toll system of Independent telephone companies. It was decided that the devisement of a perfect system for the practical and economical handling of toll business was the vital question for immediate thought. To carry out this system effectively and satisfactorily it was agreed that it must be governed by certain fixed rules, clear, concise and readily applied in practice. Many plans have been suggested in the past, but they have not proved efficient.

The method now in use by both the Independent and Bell companies is to grant to the originating station a certain commission on the toll charged, the balance after such deduction is to be divided pro rata in proportion to land, air line mileage, traversed

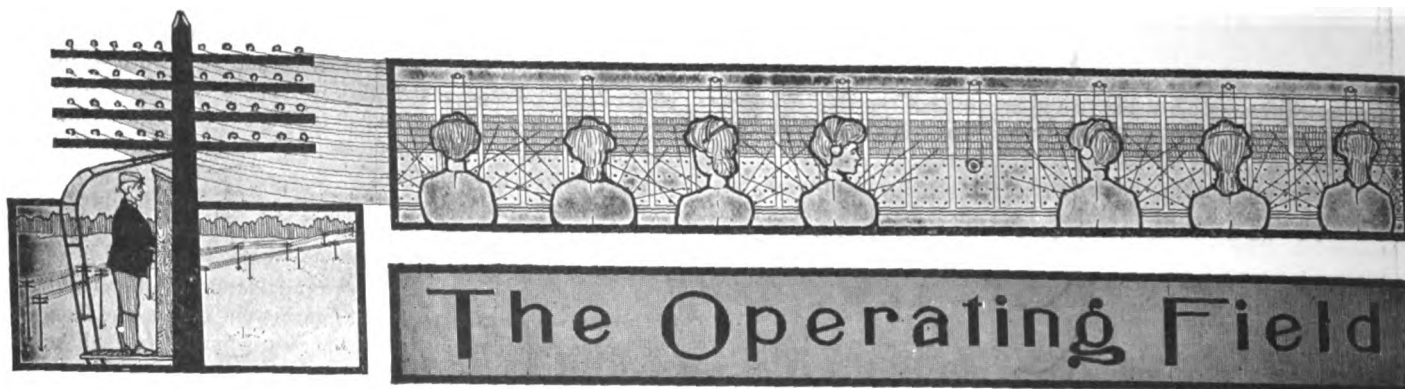
between points of origin, transfer and detention. It was decided further that some plan of rapid settlement was necessary, and to carry this out most satisfactorily a traffic exchange or clearing house should be established. This system when established and invested with the proper authority would be very simple. In order to carry out these improvements as quickly as possible with the best results, a committee composed of Theo. Thorwood, of South Bend; C. A. Reeves, of Plymouth; Claude R. Stroop, of Nappanee; J. W. Scott, of Warsaw, and J. K. Johnson, of Elkhart, was appointed.

An association was also organized with Mr. Von Duzen, of Michigan City, as chairman, and J. K. Johnston as secretary. The association will convene again at the end of thirty days to report on the progress made and to give a name to the association. The question of Postmaster-General Payne's order was brought up at the meeting and the committee was ordered to correspond with Congressman Brick, asking him to look out for the Independent interests.

TELEPHONE CABLES WITH IRON WIRE COILS

THE statement of some experimenters that surrounding telephone cables with iron will not be sufficient to compensate the capacity, is true only of iron windings in the form of open helices. Surrounding the cable closely with several sheets of thin iron wire will result in a material increase of the self-induction. As the magnitude of the latter is dependent only on the alteration of the flux in the magnetic field of the conductor, whereas the number of lines of force is dependent on the frequency and intensity of the current, it would be best to surround each conductor apart with a substance of maximum permeability. Long, thin wires, of good, soft iron, show a great longitudinal permeability, a sleeve of thin iron wire thus offering to the magnetic cycle the smallest possible resistance, so as to insure a material increase in the number of lines of force and the magnitude of self induction, as compared with sleeves made from

iron ribbon. Mr. C. E. Walsøe, in a paper recently published in the *Elektrot-Zeitschr*, thinks this method, as suggested by Krarup, to be more rational than the Pupin scheme, as in addition to the ohmic resistance not being increased, the self induction is uniformly distributed over the whole length of the circuit. Moreover, Pupin induction coils can replace a uniformly distributed self induction only for one given value of the frequency, whereas, in the transmission of language, the frequency, as is known, varies between 100 and 1,000. Special experiments have shown the Krarup method to produce no increase in the capacity. On the other hand, the increase of the self-induction soon reaches practical limits. Moreover, the frequent magnetic cycles of the iron will result in certain energy losses by hysteresis, whereas in Pupin's induction coils, the ohmic resistance is increased. Apparently, therefore, both systems are far from the ideal solution.



NOTICE CONCERNING THE INTERNATIONAL ELECTRICAL CONGRESS OF ST. LOUIS.

ACCORDING to the present indications, the International Electrical Congress, to be in session at St. Louis, September 12-17, 1904, will be one of the most successful that has yet been held, both with respect to the number of adhesions and to the value of transactions.

Up to date about 3,550 circular letters of invitations to join the Congress have been issued to persons or associations in North America. From these, 875 post-card acceptances of membership have been received. About 350 similar circular letters of invitation have been recently sent to other countries. It is intended to issue in all about 5,000 invitation circular letters in America and about 6,000 in foreign countries. It is expected that many persons will join the Congress, both in America and abroad, who do not expect to attend the sessions in St. Louis, in order to secure a copy of the Transactions, which will form one, and perhaps two, large octavo volumes. Collection of fees has commenced, and upon receipt of a fee the member will be forwarded a Certificate of Membership. The certificate is 8½ inches by 11 inches in size (21.5 cms. x 28 cms.) and printed on heavy paper of excellent quality.

Recently 280 special letters of invitation have been issued on behalf of the Committee of Organization to prominent electricians and electrical engineers, signed by the President and the General Secretary of the Committee, requesting papers for the Congress in the various sections. Of these, 146 have been sent to foreign authors, and 134 to American authors. There has not been time to receive replies from more than a few foreign authors, but 21 acceptances have up to date been received from abroad, and 46 acceptances from North America. Sixty-seven papers are thus already promised for the Congress, and the number is steadily increasing. A considerable further number of invitations to contribute papers have yet to be issued.

Arrangements are being made with a view to perfecting plans of co-operation between the Congress and electrical societies and associations in various parts of the world. Invitations have already been extended to the Congress members to visit places of electrical interest on the journey to or from St. Louis. The Committee of Organization of the Congress consists of Elihu Thomson, President; A. E. Kennelly, General Secretary; W. D. Weaver, Treasurer; Bion J. Arnold, Vice-President and Chairman of Executive Committee; C. F. Scott, Dr. S. W. Stratton, Prof. H. S. Carhart and Prof. W. E. Goldborough, Vice-Presidents. All communications should be addressed to the General Secretary, Dr. A. E. Kennelly, Harvard University, Cambridge, Mass.

IMPROVEMENTS AT OSKALOOSA.

THE Home Telephone Company of Oskaloosa, Iowa, starts on the new year with an extensive improvement, the enlarging of its local exchange by two new additional sections to its switchboard and the stringing of considerable new wire. Also a new metallic circuit for the long distance service. The cost of the improvements to the company will amount to several thousand dollars. The new switchboard will accommo-

date the increasing demand for telephone service about the city for some time to come, as a portion will be devoted to party lines. The cost of the party line instrument to the subscriber will be only one dollar per month.

The new boards now being placed in the office mark the extent of the possible growth of the present exchange. Should the unprecedented increase of the past several years be continued it will be impossible for the traffic to be handled with the present system, and a multiple board will be necessary. Manager W. D. Dunsmore states that the field is now pretty thoroughly covered and he believes that the new board will be sufficient to accommodate the demands of the exchange for some time to come. The exchange now has about fifteen hundred subscribers, and others are being added continually.

HER INTENTIONS WERE GOOD.

IN the February number of the *Ladies' Home Journal*, which on account of its general attractiveness we could not refrain from looking through, there is a picture of a neatly gowned young woman talking into a pay station telephone. This looked shabby, so in the looking we hesitated and read this:

"When you use the telephone do not put your mouth too near the receiver."

We are responsible for the italics. The advice, all will admit, is excellent, because facial distortions merely to use a telephone would be inexcusable. We, encouraged and pleased by this sample of common sense advice, carefully read the balance of the page and failed to find more that appealed to us as strongly. The page is conducted by a lady M. D., and on it she tells young women how to become strong and happy and beautiful, so one can easily understand why she writes it is well to keep the mouth a reasonable distance from the receiver when using the telephone.

UNITED STATES LONG DISTANCE LINES.

WORK has been begun on the \$500,000 extensions and additions the United States Telephone Company will make to its long distance lines during the present year. The first work will be stringing two heavy wires between Cleveland and Toledo to accommodate the business between the two cities. The wire is of extra size and quality and during the year will become a part of the through wire from New York to Chicago. As quickly as these wires are completed from Toledo to Cleveland the work of extending them east to Buffalo will be taken up, and during the summer the wires will be continued from Toledo west, where they will be tapped by the wires running up into Michigan and south through Indiana and Ohio.

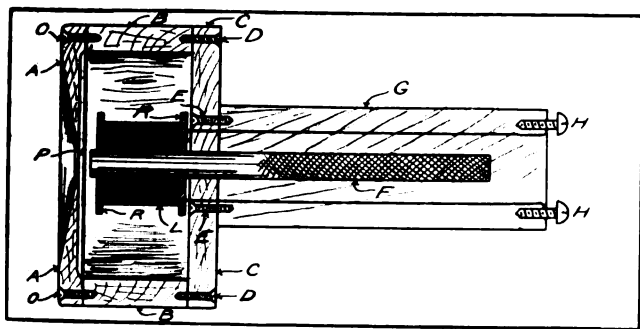
The wires to Toledo will carry both telephone business and a complete telegraph service, the same as the other lines of the United States Company out of Cleveland. The wires are capable of furnishing the two services complete without interruption to either. From this double toll the company secures a very large addition to its revenues and largely increases its profits. The through service from New York to Chicago will be completed as quickly as the wire is run east to Buffalo and west from Toledo to South Bend and the connections made, but it is the intention of

the company ultimately to have its own wires throughout the entire distance, as both the present connection and the through wires will be required to handle the business.

A HOME MADE RECEIVER.

THE accompanying drawing is a section of a receiver, the description of which was received at this office in a letter from one of our subscribers, and shows what can be done with few tools and materials, by a man who has constructive and inventive ability. This receiver was used by its maker for testing for short circuits, opens, etc., in the instruments and lines under his care. He places the receiver in series with a battery, and by tapping the two free terminals on different parts of the apparatus in which he is trying to locate trouble, he can tell by the clicks in the receiver which are defective, and he tells us that he has already saved much time by the use of his primitive device. His description of its construction is as follows:

A A is a piece of wood, *B B* is a ring made from wood, *C C* is



also of wood, and *D D* are screws. *G* is a piece of wood with a hole in it, and *F* is a portion of a rat-tail file. *L* is a coil of wire around the file which terminates at *H* and *H* in two screws. *R* and *R* are two leather rings to fit on the file to hold the wire in place. *P* is a piece of photographer's tin three inches in diameter. *O O* and *E E* are more screws. The piece of rat-tail file was magnetized from a permanent magnet until its strength was sufficient to hold the piece of tin by the edge. The way the instrument was assembled is shown plainly in the drawing.

USE OF RURAL HIGHWAYS.

THE Supreme Court of Kansas, in the case of Michael McCann vs. the Johnson County Telephone Company, has held, in contradistinction almost to the case above mentioned, that the use of a rural highway by a telephone company for its poles and wires is an additional servitude. The company in this case set a pole in the center of a driveway leading into plaintiff's yard. He cut the pole down and sued for an injunction to restrain its erection again. The district court dissolved the injunction. McCann appealed to the Supreme Court and secured a reversal and an order allowing a permanent injunction. In its decision the court said: "The fee of a rural public highway is in the adjoining land owner. The public has an easement only. The right of easement in the public does not authorize a telephone company permanently to appropriate any part of the highway to its own use by the construction and maintenance of a telephone line, for such use of the highways casts an additional burden on the land for which the owner is justly entitled to compensation."

McCann vs. Johnson County Tel. Co. (Kan.), Pacific Reporter

DOINGS AT OGDEN, UTAH.

THE Independent Home Telephone Company will not be ready for business until June 1st. That is the opinion of the local manager, John M. Forristall. He, however, says that with anything like favorable weather the line will be connected with Salt Lake in two weeks, but not for public business. The laying of the cables has not commenced and will not until after the line has been connected from Salt Lake City. All of the

poles to be used for the lines throughout Ogden and between Ogden and Uintah, are already on hand and are painted ready for use. The line has already been completed from Salt Lake to Farmington and three gangs of men are working on the other portions. The exchange building is complete with the exception of the interior finishing, the switchboards and other necessary furnishings.

THE CO. SOLD OUT TO THE BELL.

WHAT comes of an Independent operating company selling to the Bell is well illustrated by the item below clipped from a local Virginia paper. The Hampton, Virginia, Company mentioned was at one time an Independent company in good standing, but could not resist alluring offers that were made by the monopoly agents, so they sold out.

The board of supervisors of Elizabeth City County has adopted strong resolutions calling upon the Hampton Telephone Company to give its patrons better service. The attention of the board was directed to the matter by County Clerk H. H. Holt. After some discussion of the matter the board directed Clerk Holt to prepare the following resolution, which will be forwarded to the company at once:

"WHEREAS, It appearing to the board of supervisors of Elizabeth City County that the Hampton Telephone Company, a corporation operating its lines in Elizabeth City County by virtue of a franchise granted said company by this board, is not now, and has not for some time past, been giving reasonably good service over its lines to the public; therefore, be it

"Resolved, That the Hampton Telephone Company be requested to make such corrections in its service as is proper for public good; and

"Resolved further, That the clerk of this board is hereby directed to notify the Hampton Telephone Company, that if such corrections in service are not made within two weeks from date of this order, to take the matter up with the officers of the Southern Bell Telephone Company—the assignee of the said Hampton Telephone Company."

Merely a repetition of the old story, and probably none realize it better than do the citizens of the city of Hampton.

PAYNE'S ORDER BRINGS POSTMASTER TO WASHINGTON.

THE trouble between the Bell Northwestern Telephone Company and the Twin City Company, for the installation of service in the St. Paul and Minneapolis postoffices, has been transferred to Washington. Postmaster A. R. McGill, of St. Paul, went to Washington and took the matter up with Gen. Henry Payne, postmaster-general. Postmaster McGill claims that both companies should be given an equal share of the business on the ground that many business firms and patrons of each postoffice are subscribers to both companies, and that it will facilitate business to have both lines installed in the postoffice.

THE CENTRAL UNION GETS AN ULTIMATUM.

THE Central Union Telephone Company has been operating in the city of Wabash, Ind., without a franchise for the past five months. A franchise was offered to it, but the company took no steps toward accepting it or complying with its terms. The Wabash council last week directed the city clerk to notify the company that unless the officers sign and accept the franchise offered to the company some time ago, as it stands, the city authorities would at once begin the removal of all the company's poles and wires from the streets and alleys.

A PHANTOM CIRCUIT.

THE Home Telephone Company of Elkhart, Ind., now has four lines between Elkhart and Goshen, the latest addition being a "phantom circuit." The "phantom circuit" does not affect in the least the two wires of the other two circuits, and three conversations can be carried on over the two metallic circuits. In addition the company has another line to Goshen, thus making four lines in all. The "phantom circuit" has been tried in many different exchanges but proved a failure in nearly every case. Manager Johnson, of the Home Telephone Company, says the one installed by him is successful in every way.



NOW ENTERING UPON A THIRD ERA.

INDEPENDENT telephony is entering upon a new era and one which augurs well for the future. The Independent operators have fought the hard fight; they have kept the faith. The crown of the success which they well deserve is now theirs.

The first era was inaugurated when sporadic efforts began to be put forth here and there to throw off the galling yoke of Bell telephone monopoly. The second was when these Independent operators began to associate themselves together for mutual inspiration in great conventions, meeting annually. The recent very successful convention of the Interstate Independent Telephone Association marked the high-water stage of these educational alliances and really ushered in the third era, the formation of natural groups of Independent companies in close commercial alliance.

During the few weeks which have elapsed since the Interstate convention a number of these Independent groups have been formed with the territory of each individual company well defined and the ratio of charges determined. It needs only another step to similarly associate all of these Independent groups scattered throughout the country, and then possibly the merging of the various Independent toll systems will follow inevitably. However that may be, the fact that Independent companies are alive to the need of co-operation and of systematic rather than sporadic warfare against the combined Bell interests is encouraging and is indicative of a great and bright future.

The Independent telephone companies have been contending against a systematic, organized and unscrupulous foe, backed by unearned millions wrung from the pockets of the people. In view of these conditions their success has been no less than marvelous. The Bell modes of attack have been various and many of them shameful. Just at this time there are two special methods of attack to which the *AMERICAN TELEPHONE JOURNAL* has persistently called attention. The Bell people are trying to get hold of the toll business of the country, and to that end are trying to persuade local companies into long time contracts that will keep them from becoming feeders to any future Independent line, and they are secretly trying to get control of the manufacturing interests devoted to the construction of telephonic equipment.

This cannot be too often stated and emphasized. The first of these two schemes is legitimate and wise from the point of view of the Bell interests. If the Bell people had been able to see the wisdom of such a course earlier, and had encouraged rather than alienated local feeders, there would not to-day be two hundred million dollars invested in Independent telephone lines in the United States and two million and a half Independent telephones in operation. From a purely commercial point of view the key to the whole telephone situation is the toll line. Feeders are necessary and more or less profitable, but the net earning capacity of the toll line is much greater in proportion than that of the various exchanges with which it connects.

LET YOUR CONVICTIONS GUIDE YOU.

The second scheme, as the secretary of the Interstate Association pointed out at the recent convention, that of secretly gaining control of the manufacturing interests, is more direful than any other method. "It is a conceded fact," he said, "that one of the largest manufacturing concerns in the country is now in the control of the Bell people." This reference to the underhand purchase of the Kellogg Switchboard & Supply Company is along the line of the warnings which have been repeatedly sounded by the *AMERICAN TELEPHONE JOURNAL*. Ordinary aggressive and wise competition and business methods are sufficient to frustrate the first scheme. The formation of allied groups of Independent companies for mutual protection and mutual interests will be fatal to it. The second scheme is more insidious, and to overcome it requires even more persistent and systematic effort. Just how far the Bell people will go in the endeavor to demoralize the Independent companies cannot be determined. But we have seen how at least one so-called Independent periodical has been used and at least one manufacturing institution has passed under Bell control.

Knowing these things to be true the Independents will have only themselves to blame if they walk into the traps insidiously set for them. In this connection a sentence from a recent address by Hon. Henry A. Barnhart, now president of the Interstate Independent Telephone Association, will bear repeating, because it emphasizes a line of attack which so often has been set forth by this journal.

"We get neither patronage nor recognition of any kind from the arrogant Bell company, and we *should not contribute strength to its substance* by buying apparatus from manufacturers who sail under Independent colors and turn the profits over to the Bell treasury and corruption fund."

Here is the whole situation in a nutshell. That Independent companies everywhere recognize the truth of this seems evident. Let them act on their convictions persistently and systematically, and the Kellogg Switchboard & Supply Company will go the way of many other Bell schemes—into merited bankruptcy. No manufacturing company, whether a Bell concern or otherwise, will long exist without business. Even unlimited capital is not going to operate the Kellogg plant merely for fun. The Bell monopoly is not in business for its health; nor is it in business for the health of Independent companies. These two facts should be borne in mind. The Kellogg company was originally organized as an Independent concern, and is now continued in operation solely to get all of the business possible from Independent operators. Without this business it cannot long exist; with this business it is a constant menace to Independent telephony. The thing for Independents to do is to have absolutely no dealings under any pretext whatever with a Bell concern, whatever its name and whatever its previous history.



Conducted by *A. H. McMillan*

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

SERVICE DISCONTINUED FOR FAILURE TO PAY TOLL CHARGES.

CAN we lawfully make a rule that any subscriber refusing to pay for service over our toll line by the 15th of the month succeeding that in which the bill becomes due, shall have his service discontinued and his telephone taken out? Can he make us put it back without paying up what he owes us?
S. W.

SUCH a regulation would certainly be reasonable and for failure to comply with it you could lawfully deprive the subscriber of his telephone. He would be without remedy against you. *Rushville Co-op. Teleph. Co., vs. Irwin*, 59 N. E., 327.

RENTAL DURING TIME TELEPHONE IS OUT OF REPAIR.

A SUBSCRIBER'S telephone did not work well for a few days but we fixed it as soon as we could. He demanded a deduction for the time the telephone did not work well. We were willing to grant him some deduction but not so much as he asked, because we did not believe it was out of repair all the time he claimed. He paid the next quarter's rent in advance and told us we could not take his telephone out for not paying rent. Is this so?
L. J. S.

IN a case where the facts were very similar, the Supreme Court of Missouri held that the company could not rightfully refuse service. There was some question as to whether there was really a rule of the telephone company in existence among its printed regulations furnished to subscribers and whether it had ever been communicated to the subscribers. The latter was solvent and the decision was that the company should have let the subscriber retain his telephone and should have sued him for unpaid rent. See *State vs. Kinloch Teleph. Co.*, 67 S. W., 684. In your case the question would hinge very largely on whether you had a regulation properly covering the subject and communicated to your subscribers. If you did, you could remove his telephone. You should be sure that you are right as to the time the telephone was out of repair, because he could not be obliged to pay rent for that time.

A MUCH TRIED TELEPHONE CASE.

THE Black River Telephone Company of New York State, in the construction of its lines through the village of Lowville, strung wires in front of the residence of Reuben Miller, and in order to facilitate the work trimmed shade trees without his knowledge or consent. Mr. Miller brought suit against the company in justice's court to recover for the damage sustained by him through such trimming of trees. The case was tried before a jury, but the jury failed to agree. Upon the second trial of the case in justice's court, the jury rendered a verdict in favor of Mr. Miller. The defendant telephone company then appealed to the Lewis County Court, and that court affirmed the judgment of the lower court. An appeal was then taken by the company to the appellate division, which court also affirmed the judgment of the court below. The defendant served a notice of appeal to the Court of Appeals from the judgment of the appellate division. But under the provisions of section 191 of the code of civil procedure, no appeal can be taken to the Court of Appeals in any action which did not originate in the Supreme Court, the County Court, the Court of Claims or the Surrogate's Court, unless a certificate is first obtained from the appellate division stating that some question

of law is involved that ought to be reviewed by the Court of Appeals. As such a certificate was not obtained from the appellate division at the term at which the decision was handed down, nor at the following term, and the time in which to obtain such a certificate having elapsed, nothing was left for the company to do but to pay the judgment, which it did.

Miller vs. Black River Teleph. Co., New York Supplement.

A REVOCABLE LICENSE AND NOT A PROPERTY RIGHT.

IT is held in Massachusetts that quasi-public corporations placing their wires underground, under chapter 454 of 1894, acquire in the public streets no franchise that amounts to an individual right of property for which compensation must be awarded them if their conduits are removed by public authority. This is the decision of the full bench in the case of the *Boston Electric Light Company vs. the Boston Terminal Company*. The court holds that that statute merely permitted persons and corporations which had used the public streets for their poles and wires, under a license, to remove them and place them underground under a like license, which the legislature or city council could order revoked. The electric light company sought damages for the destruction of its electric light conduits and franchises in old Federal and Kneeland streets, under the terminal statute of 1896, claiming that the terminal act was unconstitutional, as it took away without compensation private property rights which, it claimed, it acquired by the underground wire act. But the court holds that it acquired merely a revocable license, which either the legislature or the city council could revoke. *Boston Electric Light Co. vs. Boston Terminal Co. (Mass.)*, *Northeastern Reporter*.

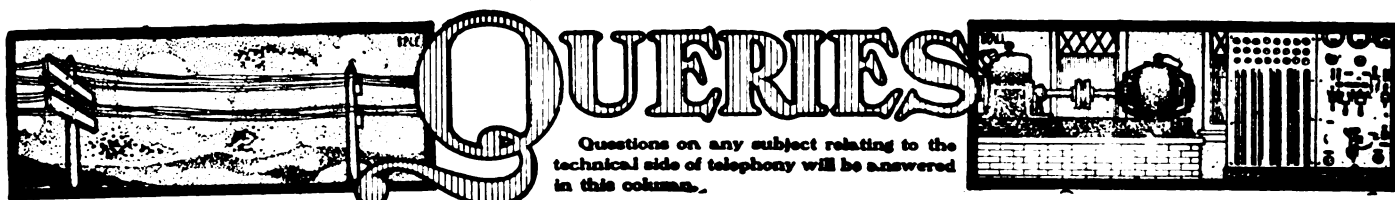
KANSAS SUPREME COURT UPON ADDITIONAL SERVITUDE.

DECISIONS upon telephone poles as an additional burden upon highways are coming thick and fast from the Supreme Courts of various States. The Supreme Court of Kansas has recently rendered a decision upon this question in the case of *Michael McCann vs. the Johnson County Telephone Company*. McCann is a farmer in Johnson County. The telephone company strung a line on the country road adjoining the farm. Its employees set one of the telephone poles right in the center of a driveway leading into his yard. He objected and asked them to set the pole ten feet to one side. They refused. This enraged McCann, and he cut down the pole. Then he brought suit to enjoin the company from building the line along the road, claiming that it had no legal right to do so.

The district court dissolved this injunction. McCann appealed to the supreme court, and that tribunal has reversed the lower court and ordered judgment entered, making a permanent injunction. In its decision the supreme court held:

"The fee of a rural public highway is in the adjoining land owner. The right of easement in the public does not authorize a telephone company permanently to appropriate any part of the highway to its own use by the construction and maintenance of a telephone line, for such use of the highway casts an additional burden on the land for which the owner is justly entitled to compensation."

McCann vs. Johnson County Teleph. Co., Supreme Court of Kansas, Pacific Reporter.



TROUBLE FROM INDUCTION—(278).

I enclose you a rough diagram of my lines, one of which is in trouble. All lines are full metallic circuit. A diagram of conditions is shown in Fig. 278. The line *B* always rattles when connected at central, but if connected at subscriber's station *x* by switch to line *A* and over line *A* to central, they can be heard all right at any point, either at central or along lines *A* and *B*.

This trouble has been ever since a third line 1 and 2 was put up by persons who didn't place wires side by side but placed one on either side of *B* from *E* to *C* and then on the outer sides of *A* and *B*. About one mile from central *F* the *A* and *B* lines go one way and 1 and 2 go another way.

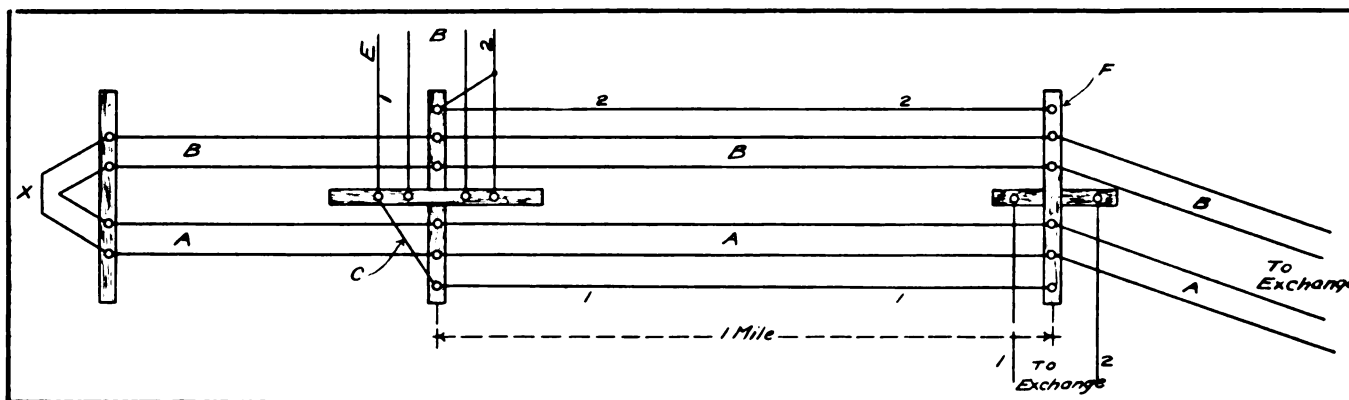


Figure 278.

Now the question is, can the wires 1 and 2 affect the line *B* as to cause this rattling? I have removed all grounds on the lines and there are no loose connections. The trouble is the worst in windy weather.

The conditions which you describe in the accompanying sketch are particularly favorable to the production of inductive disturbances upon the several lines represented. The fact that when *X* and *B* are connected together there is no difficulty, is explained upon an inspection of the diagram, which shows that under such circumstances the several lines do not parallel each other, and therefore there is little to be feared from induction. The best remedy is to set the wires 1 and 2 on one side of *A* and *B* on the other side of the pole, and then to thoroughly transpose all lines. If this is done, it seems to us probable that the difficulty that you speak of will be largely if not entirely remedied. We take it that what you mean by rattling is the noise to which telephone lines are subject, which is known as induction.

A HOME-MADE OHMMETER QUESTION—(279).

I notice a description of a "Home-made Ohmmeter" in your issue of December 5th. According to the description a piece of resistance wire 10 feet long is required, making the instrument over 2 feet long when finished. The wire is divided into 500 divisions. I would like to ask if the wire could

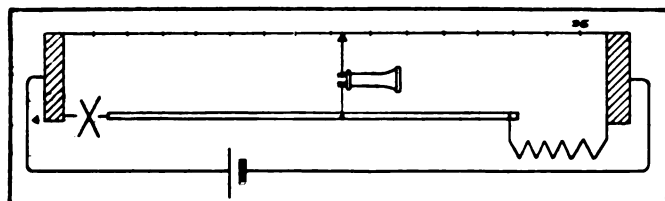


Figure 279.

not be made much shorter and yet answer the same purpose. I have a book called "Electrical Designs" in which there is a similar one described, the circuit of which is shown in Fig. 279. This one is only about 3½ feet long, or the wire just one meter, and then divided into one hundred parts. Now can the same measurements be made on this one as on the one with 10 feet of wire with the same accuracy? If so, could we not make one just as good with a wire a foot in length? F.N.

It is perfectly practical to vary the resistance wire used in the construction of an ohmmeter in any way that may be desirable. It can be readily seen that the limits of accuracy of the instrument will depend upon the precision with which the

distance of the moving contact from end of the wire can be determined. If the wire is very short an error of .001 of an inch in measuring these segments will be a much greater percentage of the total length of the wire than it will be if the wire is long. In the account of the ohmmeter to which you refer 10 feet of wire was used solely to obtain greater accuracy. For example, with a wire 10 feet long, divided into a hundred parts, one part would be a tenth of a foot, or about one inch and a quarter, and it would be very easily possible to measure to one

thousandth of the length of the wire, whereas with a wire one foot long divided into 100 parts, each part would be a little over a tenth of an inch long, and to sub-divide the wire into a thousand parts would cause each part to be about .001 of an inch long. It would be difficult to measure with as great accuracy as this.

RECIPE FOR SOLDERING PASTE—(280).

Can you please give me a recipe for the soldering paste such as electricians use when soldering wire joints? N. P.

It has not been possible for us to find a definite composition of such a soldering paste, but the *Scientific American*, New York City, gives us this information: A soldering paste may be made from Canada balsam with a small portion of sal ammoniac mixed with it in such proportions as to make a stiff paste. The soldering sticks may be made by adding resin to the above mixture, enough to harden it so that it may be melted to flow upon the parts to be soldered by the soldering copper.

SHOULD BE METALLIC THROUGH CABLE—(281).

Would it be better practice in a grounded telephone exchange to wire all lines metallic from switchboard to cross connecting rack and ground, than to wire all metallic through cable and ground at terminal? Cable to be paper insulated, twisted pairs. V. S. S.

The most modern practice is to wire all lines metallic from the switchboard through the cross connecting board and through the cable, putting grounds upon the appropriate side of each pair where the cable passes through a protected cable head to the open wire line. If this is done there is much less likely to be inductive troubles with the cables, and also in the future when a subscriber is made entirely metallic it is only necessary to cut away the ground from the twin of the proper pair of the cable and connect to the open wire.

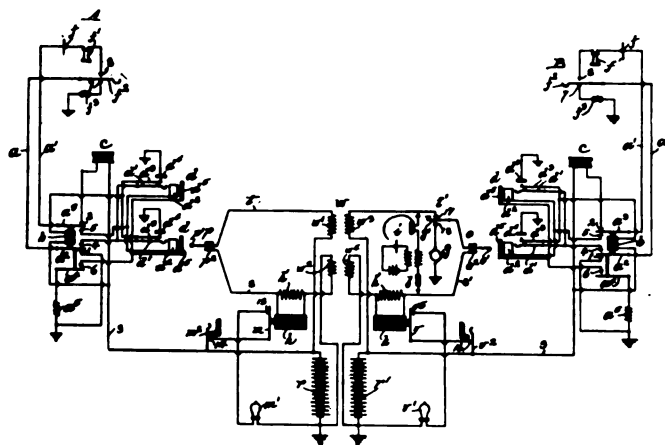
CORRECTION—"IMPEDANCE OF CONDENSER"—(275).

In our issue of January 30, 1904, No. 5, on page 74, an answer was given to a query relating to the resistance of a condenser. In working out this solution an error of one decimal was made which we desire to correct. Consequently, the impedance of a condenser of 1 M.F. to a current with a frequency of 16 should be 10,000 ohms instead of 1,000, and that of 2 M.F., 5,000 ohms, half a M.F. 20,000 and a quarter of a M.F. 40,000 ohms.

PATENTS ISSUED

IMPROVED COMMON BATTERY CIRCUIT.

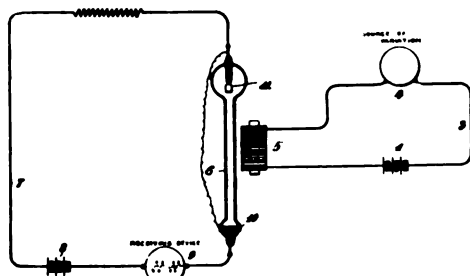
K. B. Miller, Chicago, Ill., patents (No. 749,798) and assigns to the Kellogg Switchboard & Supply Company, an improved common battery circuit. The special feature of this common battery circuit is the provision of a plug-seat switch for the purpose of controlling the supervisory signal. This circuit is shown in the figure, in which *A* and *B* are the subscriber's sub-



stations equipped in the ordinary manner and extended to the office by the lines *a* and *a'* which terminate in the springs of the cut-off relay *a2* and *b3*. The spring *a3* has a back contact *2* in circuit with an annunciator *C*. When the receiver is removed from the hook battery flows through this annunciator, indicating a call. The insertion of the plug *p* grounds the spring *d3* and operates the cut-off relay. When the plug *p* is inserted the cut-off relay *b* is operated by the ground at *d3*, hence the line signal is cut off. As soon as this plug is inserted battery flows from the battery *r* over the tip side to the plug *t* thus over the subscriber's line and back to the sub-station *A*, then to the supervisory relay *h* and to the grounded side of the battery. Thus the relay is excited and the jack portion of the lamp *m* is kept extinguished. As soon as the subscriber hangs up the receiver the line is broken which gives the office signal. When the operator removes the plug and returns it to the plug socket she opens the contact at the spring *M2*. This extinguishes the lamp.

TELEPHONE RECEIVER.

Peter Cooper Hewitt, of New York, N. Y., patents (No. 749,791) a method of receiving telephone messages involving the use of a vacuum tube. This invention is illustrated in the figure. The inventor has discovered that a vacuum tube containing a metallic

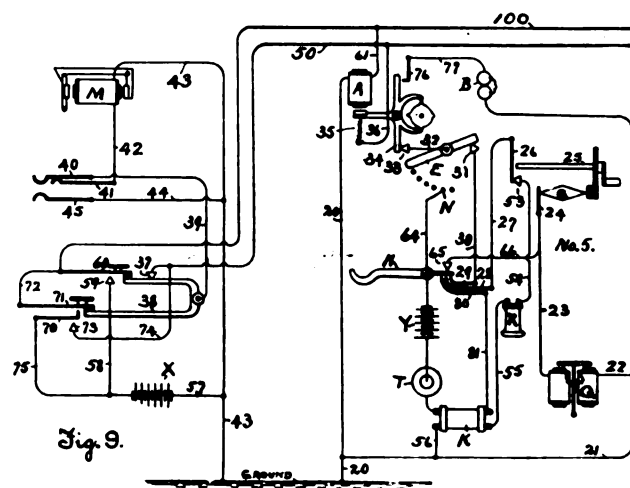


vapor is exceedingly sensitive to the presence of a magnet, the resistance of the tube changing very markedly with any change in a vibrating magnetic field. He proposes to utilize this fact in the development of a telephonic apparatus. In Fig. 1, *r* is a source of electric currents, *s* is a suitable magnet which is placed

in proximity to the vacuum tube *6*; *4* is any means of varying the resistance of the circuit *3*, such as a telephone transmitter. When there is any variation in the current through the circuit *3* the magnetic field produced by *5* will vary. This affects the resistance of the vacuum tube *6*, and consequently changes the current through the receiving device *9* which may be a telephone receiver, and thus reproduces sonorous vibrations set up in the vicinity *4*.

PARTY LINE EXCHANGE SYSTEM.

F. A. Lundquist and J. K. Norstrom, of Chicago, Ill., patent (No. 749,308) an improved party line system and assign to E. M. Richardson, Sterling, Kansas. The object of this invention is to provide a party line system which is entirely selective and secret and in which every subscriber cannot interrupt a conversation which is already taking place. The invention is an exceedingly complicated one, so much so that it is impractical to describe it in full in a digest. A skeleton of the circuit is shown in the figure, giving a diagram of substation circuit and that of the central office. Briefly, the inventors provide at each substation a clock work, the escapement of which, shown at *36*, is controlled by the electro magnet *A*. Every time that an impulse is sent over the line this electro magnet is energized, the armature *35* attracted, and the escapement wheel allowed to move one notch. This operates the contact *E* which passes over as many contact points as there are stations on the line. The contact point for each station is different from that of every other station. Con-

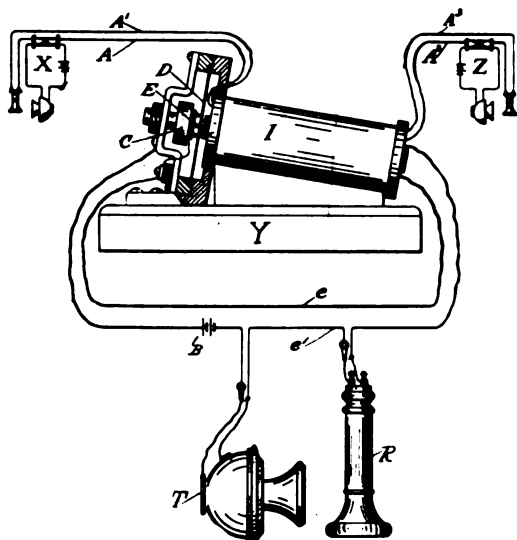


sequently the exchange operator, by sending any pre-determined number of impulses can cause the contact brush in any station to rest upon the contact which belongs to that station and in this manner signalling is selective. So soon as one station has made a call the contact brushes *E* of all stations are deflected from their normal positions and therefore, it is impossible for all other subscribers to signal. Upon the completion of conversation, by means of the electro magnet *Q*, the operator can release the contacts which by means of a spring, return to their normal position.

TELEPHONE REPEATER.

Merritt Gally, of Brooklyn, N. Y., patents (No. 749,481) an improved form of telephonic repeater. This patent is an improvement and modification of a previous patent filed by the patentee March 18th, 1903. The invention consists in a doubly-wound magnet coil *I*, one winding of which is connected with the station *A*, another with the station *A'*, while a third is connected

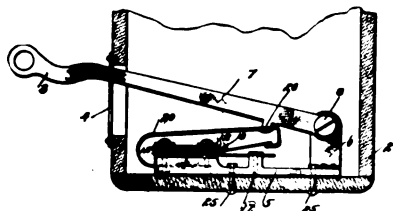
with the local station represented by the transmitter *T* and the receiver *R*. In the rear of this coil is a diaphragm *D* which impinges upon carbon contacts *E*. Thus telephonic impulses transmitted in either direction by the stations *A*, *A'* or *A3*, will act upon the coil *I*, cause the diaphragm *D* to vibrate, and may be perceived in the receiver *R* or the vibration of the diaphragm



D may intensify the impulses to be propagated along the balance of the line.

IMPROVED TELEPHONE HOOKSWITCH.

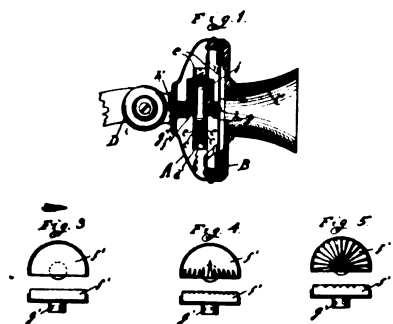
E. E. Yaxley, Chicago, Ill., patents (No. 749,977) and assigns to the American Electric Telephone Company an improved hookswitch. The object of this invention is to provide a hookswitch which is simple and economical to manufacture, reliable and efficient in operation and unlikely to get out of order. It is illustrated in the figure, in which *z* is the telephone box upon which the base plate *5*, is placed, which carries a projection *6*, to



which the hookswitch arm *7*, is pivoted by means of the screw *8*. There is also a spring *20*, for lifting the hookswitch which is attached thereto by means of a boss *23*, which fits into a hole punched in spring *20*. The end of the spring is turned over and fitted between springs *12* and *18*. Thus the desired contacts can be opened and closed.

TELEPHONE TRANSMITTER.

C. F. Bennett, of Waterloo, Iowa, patents (No. 748, 690) an improved telephone transmitter. The object of this invention

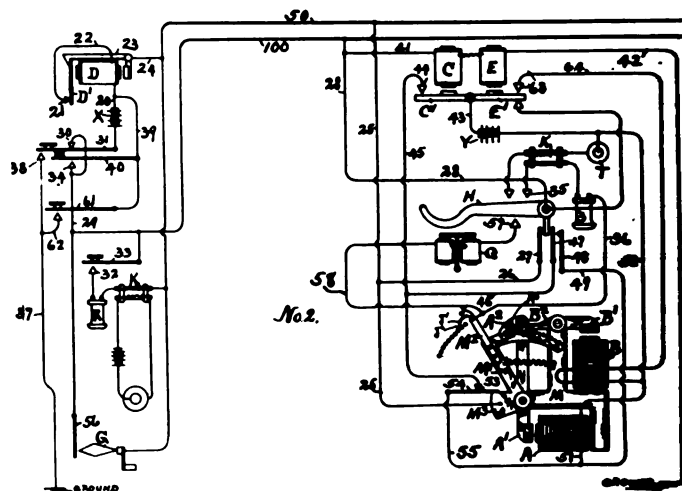


is to prevent the packing of the granular carbon which is so common in microphone transmitters. The invention is illustrated in Fig. 1, which is a sectional view and in Fig. 5, which is an eleva-

tion and section of the electrode. The inventor provides the ordinary transmitter arm, *D*, upon which the case *A* is pivoted, holding the front plate *B* to which the mouth piece *C* is affixed. The carbon receptacle, which forms the basis of this patent, consists of two electrodes *f* and *f*, which, as shown in Fig. 5, are formed of serrated carbon plates. These are attached respectively to holders *g*, which are secured to the diaphragm and to the rear of the transmitter case. The felt ring *b* serves to separate the electrodes and also to form an enclosure into which the granular carbon is placed. The inventor arranges the electrodes so that they may have a substantial horizontal base, and fills the space between them with granular carbon. The serrations of the face of the electrodes tend to prevent packing, usual in instruments of the ordinary construction in which the lower part of the chamber is circular, and causes a wedge-like action of the granules.

PARTY LINE SYSTEM.

N. E. Nostrom, Chicago, Ill., patents (No. 749,824) and assigns two-thirds to J. Anderson, Salina, and M. E. Richardson, Sterling, Kansas. The object of this invention is to provide a party line system which shall be selective and secret. It is operated on the familiar step by step principle and is shown in the figure. The operation is as follows: Supposing, if a subscriber wishes to call, he removes the receiver, the hook *H* rises, making contact with spring *27*. The battery *X* at the office is then given circuit over the line, as can be easily traced, and throws the drop *d* signaling the operator. By means of the key *33*, the operator can then talk to the subscriber and obtains the



order. The calling subscriber then hangs up the receiver, the operator then presses key *31* and current flows as follows: From ground at the office to *37*, *38*, *31*, *X*, *20*, *39*, *40*, *34*, *29*, *100*, *28* and each station to *41*, operating relays *C* *E* *42*, to ground. This closes the contact points *44* and enables the operator to excite the magnets *A* and move the contact arm *M'* by means of this magnet to any contact point that she desires. When the arm arrives at the proper point, the operator rings in the usual manner and thus signals the desired subscriber. The operator ascertains when conversation is completed by listening in and then presses key *6*, which thus reverses the current through the magnet *C* and *D* moving the armature *A'* to contact *63*. This releases the pawls upon the selecting lever quadrant and the contact arm returns to its normal position.

TELEPHONE IN COAL MINING.

JAMES EPPERSON, inspector of mines for Indiana, says that without doubt one of the most important factors in accelerating the work of a coal mine nowadays is the telephone. Less than six years ago the use of the telephone in the Indiana coal mines was not thought of, but so far as it has been introduced has fully proven its usefulness. A process of development is now going on and many improvements are being made to lessen the hazards of the mines and avoid accidents, and the equipping of mines with telephones is regarded by Mr. Epperson as one of the important aids along that line.



FINANCIAL

BIRMINGHAM, ALA.—It is probable that the mayor will sign a contract with the People's Home Telephone Company by which the latter company will install a system for the police department with fifty telephones.

DECATUR, ILL.—On March 22, 1898, six years ago, there was a sale held against the Citizens Mutual Telephone Company of Decatur to satisfy a bonded indebtedness of \$20,000. The plant was purchased at this sale by the bondholders and the company was re-organized under the name of the Macon County Telephone Company. At the present time the plant is in a very prosperous condition, under the management of C. S. Hankins, president; M. B. Hankins, secretary and treasurer, and W. B. Burke, manager. The plant has been rebuilt with a full system of underground conduits, necessitating a large expenditure of money, and has grown to be an important institution in the telephone line. Through an unavoidable error, in our issue of December 5, 1903, it was stated that the plant was to be sold on the 22d day of March under chattel mortgage to satisfy a bonded indebtedness of \$20,000. We trust the above explanation will set this matter right.

MOLINE, ILL.—An effort is being made to have the injunction brought by the Central Union Electric Telephone Company against the Union Electric Company acted on at once, in order that the Independent company may construct a line to East Moline to give service there.

FORT DODGE, IA.—It is probable that the Fort Dodge Telephone Company will install an exchange in Clare.

BOSTON, MASS.—The Cumberland Telephone Company reports these comparative operations for December:

December.	1903.	1902.	1901.
Earnings	\$314,418	\$276,124	\$246,644
Expenses	185,457	168,787	165,653
Net	\$128,960	\$107,337	\$80,991
Charges	24,880	26,690	19,354
Surplus	\$104,080	\$80,646	\$61,636

These operations of the Pere Marquette system are reported for December and twelve months:

December.	1903.	1902.	Increase.
Earnings	\$963,918	\$922,537	\$41,381
Expenses	729,737	796,573	*66,836
Net	\$234,181	\$125,964	\$108,217
Year.			
Earnings	\$11,431,901	\$10,590,415	\$841,486
Expenses	7,964,713	8,008,464	*43,751
Net	\$3,467,188	\$2,581,951	\$885,237

* Decrease.

MUSKEGON, MICH.—The Lake Shore Telephone Company, which operates in Oceana County, has declared another quarterly dividend of 1¼ per cent.

ADRIAN, MINN.—Arrangements are being made to extend the Enterprise Telephone line from Lismore to Adrian and connect with Worthington.

BERTHA, MINN.—The managers of the H. and W. Telephone Company have decided to construct a line from Bertha to Long Prairie and also several short lines connecting with the main line.

CENTRAL CITY, NEB.—Lloyd Wilson, manager of the local telephone system, says the organization of a farmers' line to Stark is assured, with about fifty telephones. A line to Marquette has also been projected.

OSWEGO, N. Y.—The Ontario Telephone Company, of Oswego, has increased its capital stock from \$40,000 to \$100,000.

MIFFLIN, O.—The Mifflin and Widowville Telephone Company has increased its capital stock from \$1,000 to \$5,000.

ZIONSVILLE, O.—The Citizens' Telephone Company, of Zionsville, has increased its capital stock to \$15,000.

DEADWOOD, S. D.—The Harrison Independent Telephone Company

has reorganized and is preparing to begin extensive improvements on its system.

MEMPHIS, TENN.—The Memphis Long Distance Telephone Company has executed a one million dollar mortgage to provide funds to carry on a complete construction and acquisition of properties.

POYNETTE, WIS.—The Leeds Farmers' Telephone Company, of Poynette, has increased its capital stock to \$10,000. John E. Larson is president.

RHINELANDER, WIS.—The Rhinelander Mutual Telephone Company, by its president, Samuel S. Miller, and secretary, H. J. Crawford, has increased its capital stock to \$10,000.

RIVER FALLS, WIS.—The St. Croix Valley Telephone Company, of River Falls, by J. L. Chapman, president, and J. L. Watson, secretary, has filed an amendment increasing its capital stock from \$500 to \$1,500.

SPARTA, WIS.—The Monroe County Telephone Company, of Sparta, by its president, C. M. Beebe, and secretary, Howard Teasdale, has increased its capital stock to \$40,000.

FRANCHISES

ANAHEIM, CAL.—The Home Telephone Company, of Los Angeles, has petitioned the city trustees for a local franchise. The trustees have advertised the franchise for sale.

LONGMONT, COLO.—The farmers' club has petitioned the city council for a franchise for the installation of an Independent telephone system.

WEST PALM BEACH, FLA.—The East Coast Telephone Company, which is now in operation in this city, has asked council for an exclusive franchise. An ordinance to this effect has passed second reading. Another company called the East Coast Electric Light, Power and Ice Company, of which Joseph Jefferson is president, has now asked the city for a five years' franchise for maintaining a telephone system.

CEDAR RIVER, MICH.—Crawford and Sons, of this place, will construct a private telephone line to Stephenson next spring, unless some telephone company decides to construct the line.

CANTON, N. J.—The Eastern Telephone and Telegraph Company has secured franchises in Wildwood and Angelsea and will probably secure a franchise also in Holly Beach.

JAMESTOWN, N. D.—Price Brothers have applied for the right to erect poles and string wires for a local telephone line for a distance of five miles out of town for country service. The telephone line from Buchanan to Jamestown, franchise for which was obtained last fall, is expected to be constructed this spring.

CANTON, PA.—The city council has granted right-of-way to the Canton and Leroy Telephone Company, which proposes to extend lines through the county, connecting with Lycoming County lines. A branch will be run to Troy, with central offices at Canton.

REYNOLDSVILLE, PA.—The city council has granted a franchise to the Farmers' Independent Telephone Company.

DALLAS, TEX.—The promoters of the new Independent telephone company will be granted permission by the city council to present their proposition.

LYNCHBURG, VA.—The Central Telephone Company, of Campbell and Charlotte Counties, has asked the city council for a franchise to construct and operate an exchange in Lynchburg. W. R. Smith is president of the company and John Ferris secretary and treasurer. The company has lines connecting Concord Depot, Plum Branch, Sherwell, Spring Mills, Morris Church, Brookneal and many other towns in Campbell and Charlotte Counties.

COMBINATIONS

BLANCHARD, IA.—The Hanamo Telegraph and Telephone Company has purchased the property of the State Line Telephone Company, operating in Blanchard, Coin, College Springs and other towns.

GREAT BEND, KAN.—The Great Bend Telephone Company has purchased from the Lyons Telephone Exchange the long distance toll line from Silica to Hoisington.

CLAYSVILLE, PA.—J. T. Bebout has purchased the stock and franchise of the Claysville Telephone Company.

BRUSSELS, WIS.—Hubert Dandois has purchased a telephone line between Brussels and the county seat. Mr. Dandois will extend the line to Namur.

KENOSHA, WIS.—Contracts have been signed between the Citizens' Telephone and Telegraph Company and the Kenosha and Bristol telephone companies. According to the terms of the contract between the Bristol and Citizens' companies the rural telephone users will be allowed the use of the lines of the Citizens' company without any toll charge, while a small toll will be charged from the Kenosha to the Bristol exchange. The Citizens' company further agrees not to invade the territory now covered by the Bristol company and that all the business from that section of the county will be turned into the Bristol exchange. The Kenosha company sells out to the Citizens' company.

PERSONAL

ARTHUR BERGER, a recent graduate of the Indianapolis, Ind., Manual Training High School, has constructed apparatus and devices for the sending of wireless messages. Young Berger gave a very successful demonstration before the Indianapolis Technical Society recently. His knowledge and familiarity with the subject and his ingenious apparatus are attracting the attention of local scientific men.

R. S. WASSER, manager of the Ida County Telephone Company, has tendered his resignation to the board of directors.

ELECTIONS

DELTA, COLO.—The Co-Operative Telephone Company of Delta County has elected F. R. Rockwell president; W. J. Gaunt, vice-president, and Dr. Hollansbee, secretary and treasurer. Arrangements are being made for the construction of a complete farmers' system.

PANA, ILL.—The Luzader-Watkins Telephone Company has elected Dr. I. M. Luzader president; William Watkins, secretary; Fred Michaelman, treasurer.

SWEETSER, IND.—The Sweetser Telephone Company has elected L. M. Loggatt, president; J. B. Reed, treasurer, and A. Bechtel, secretary.

AUDUBON, IA.—The Audubon County Farmers' Mutual Telephone Company has elected Frank Taylor, president; H. W. Stearns, secretary, and James Hunt, treasurer.

GARRISON, IA.—The Geneva Mutual Telephone Company has elected A. R. McGirr, president; Curtis Shaw, vice-president; Milo W. Palmer, secretary, and S. Allen, treasurer, all of Garrison, Ia.

MECHANICSVILLE, IA.—The Mechanicsville Telephone Company has elected Alexander Buchanan, president; F. L. Wilson, secretary; E. Webbles, treasurer.

MILO, IA.—The Milo Telephone Company has elected R. B. McClelland, president; J. E. Clayton, secretary; Edward J. Burgess, treasurer.

PLEASANT PLAIN, IA.—The Pleasant Plain Telephone Company has elected Jervis Haney, president; J. T. Ellyson, secretary and treasurer.

HOPKINSVILLE, KY.—The Hopkinsville Home Telephone Company, organized by R. T. Cooper, president; George H. Metheaney, of Lima, O., vice-president; Joseph F. Garnett, treasurer; F. G. Hoge, secretary, and J. T. Edmunds, chief council.

HARMONY, ME.—The Harmony and Wellington Telephone Association has elected W. G. Bailey, president; G. D. Magoon, vice-president; H. C. Hurd, secretary; F. J. Tibbetts, treasurer, and Charles Bean, general manager.

NORRIDGEWOCK, ME.—The Somerset Farmers' Co-Operative Telephone Company, of Norridgewock, has organized with a capital stock of \$10,000, by the election of these officers: Clarence Rogers, president; Justin D. Ames, clerk; C. L. Holbrook, treasurer. The directors were authorized to make contracts at once for the building of a line from Corson's Corners to Norridgewock, and from Norridgewock to Starks.

ADRIAN, MICH.—The Adrian Telephone Company has elected D. M. Baker, president; W. O. Hunt, vice-president; Charles S. Park, secretary, and George A. Wilcox, treasurer. An extra dividend of 10 per cent. has been declared, or 16 per cent. for the year. It was voted to increase the capital stock to \$50,000.

ALPINA, MICH.—The Alpina Mutual Telephone Company has elected C. H. Reynolds, president; W. H. Johnson, secretary and treasurer.

GORTON, MICH.—At a meeting of the Gorton Telephone Company, held recently, the following officers were elected: L. H. McClave, president; W. J. Houck, secretary; A. B. Ransom, treasurer, and Ed. Bier, general manager.

GRAND RAPIDS, MICH.—The Calhoun Telephone Company has elected the following officers: E. B. Fisher, president; Lycurgus McCoy, vice-president; C. E. Tarte, secretary and general manager; L. W. Robinson, treasurer.

HALSTAD, MINN.—The Farmers' Telephone Company has elected Henry Henderson, president; P. O. Holte, treasurer; A. O. Berum, secretary. The building of several rural lines was decided upon.

COLLEGE VIEW, NEB.—The College View Mutual Telephone Company has elected M. W. Newton, president; D. D. Rees, vice-president; Bert Glass-

cock, secretary; Miss Josephine Nelson, treasurer. The company appointed a committee consisting of E. R. Dymond, G. W. Shaver, and D. D. Reis to consider purchasing a new switchboard, in order that the company may secure Lincoln connections.

STOCKHOLM, MINN.—The Farmers' Telephone Company has elected these officers: John A. Eklof, president; August Sahlberg, vice-president; V. N. Mellquist, secretary; M. P. Mortenson, treasurer. A dividend of 6 per cent was declared.

MINNEAPOLIS, MINN.—The Inter-State Telephone and Telegraph Company has elected John Gulden, president; Thomas A. Revord, vice-president; James Keenan, secretary and treasurer; Charles H. Webber, manager.

DELHI, N. Y.—The Farmers' Exchange Telephone Company has elected O. R. Munson, of Meredith, president; C. H. Burgin, of Delhi, vice-president; G. Scudder, of W. Meredith, secretary and treasurer.

MIDDLETOWN, N. Y.—The Orange County Telephone Company has elected Charles Higham, president; A. B. Wilbur, vice-president; W. C. Ramsdell, secretary.

PORT JEFFERSON, N. Y.—The North Shore Telephone Company has elected J. H. Davis, president; F. H. Tuthill and W. A. Davis, vice-presidents; Charles V. Platt, secretary; C. A. Squires, treasurer, and R. J. Hawkins, attorney.

GALION, O.—The Galion Telephone Company has elected the following officers: Mark Cook, president; A. A. Whitney, vice-president; J. W. Cupp, treasurer; Saul M. Wolf, secretary; R. C. Callaghan, general manager; M. A. Charlton, manager.

HAMILTON, O.—The Hamilton Home Telephone Company has elected Frank Hart, president; Charles Griesmer, vice-president; J. W. Sloneher, secretary; F. W. Whittaker, treasurer, and A. B. Crawford, general manager.

DAYTON, PA.—Armstrong County Telephone Company, at a meeting held here recently, elected the following officers: J. H. Turby, president; W. T. Burns, vice-president; R. M. Marshall, secretary and treasurer.

VALLEY SPRINGS, S. D.—The Valley Springs Telephone Company has elected George W. Bliss, president; J. Dunham, vice-president; W. H. James, secretary, and P. F. Howe, treasurer.

BRIDPORT, VT.—The Champlain Valley Telephone Company has elected Gustav R. Walker, president; Albert Preble, vice-president; E. G. Blaisdell, secretary and treasurer.

MILWAUKEE, WIS.—The Independent Consolidated Telephone Company has elected A. L. Hutchinson, of Weyauwega, president; G. C. Marlow, of Lancaster, vice-president; N. W. Low, of Weyauwega, secretary and treasurer. O. Morseman, of Milwaukee, general superintendent, and John Kidd, Milwaukee, State agent.

WAUSAU, WIS.—The Wausau Telephone Company has elected the following officers: F. P. Stone, president; W. F. La Du, vice-president; C. S. Gilbert, secretary, and A. L. Kreutzer, treasurer. The company will make many improvements during the coming year. The report of the treasurer shows a net earning between 8 per cent. and 10 per cent. of the capital stock.

CANANDAIGUA, N. Y.—The Inter-lake Telephone Company has elected the following officers: George R. Fuller, president; Albrecht Vogt, vice-president; J. W. Taylor, secretary and treasurer.

LOWVILLE, N. Y.—The Black River Telephone Company, of Lowville, has elected the following officers: Theodore B. Basseline, president; Homer C. Markham, vice-president; S. C. Capron, secretary; Charles W. Pratt, treasurer; Julius H. Wood, assistant secretary and treasurer; J. J. Domser, general manager.

MITCHELLVILLE, N. Y.—The newly organized Mitchellville Telephone Company has elected the following directors: J. E. Little, president; William Wallace, vice-president; J. F. Brown, secretary; F. O. Rice, treasurer.

NEWBURG, N. Y.—The Colonial Telephone Company has elected these directors: S. V. Schoonmaker, W. G. Taggart, H. A. Bartlett, George G. Otis, Charles D. Robinson, Judson Lawson (of New York), and F. W. Wenzel. The directors re-elected the officers, as follows: S. V. Schoonmaker, president; W. G. Taggart, vice-president; H. A. Bartlett, treasurer; George G. Otis, secretary and general manager. The number of Colonial telephones in use in this city has been increased during the past year from 419 to 541. It is anticipated that the company will find it necessary to put in another switchboard before long on account of its increasing business.

PORT JERVIS, N. Y.—The Port Jervis Telephone Company has elected the following officers: Moses Depuy, president; D. W. L. Cudeback, vice-president; Eugene F. Mapes, treasurer; W. A. Parshall, secretary.

ROME, N. Y.—The Rome Home Telephone Company shows an increase of \$3,796.71 over the surplus for 1902, subscribers having increased from 905 to 1,004.

UTICA, N. Y.—The Inter-State Telephone Company has elected the following officers: George H. Tuttle, of Mohawk; George Hakes, of Ilion; A. P. Roth, of St. Johnsville; Walter Stafford, John Hurley, Eugene Walrath, George D. Smith, of this city.

UTICA, N. Y.—The annual meeting of the Utica Home Telephone Company was held recently at which the following officers were elected: Edgar B. Odell, president; H. T. Miller, vice-president; Edward Bushinger, treasurer; C. H. Poole, secretary and manager.

BENTON RIDGE, OHIO.—Farmers' Mutual Telephone Company has elected the following officers: W. H. Whistler, president; T. G. Clymer, vice-president; P. A. Kemmer, secretary; Daniel Jackson, treasurer. J. F. Baldwin, manager. The company will construct a toll line to Pandora.

COSHOCTON, OHIO.—The Farmers & Merchants' Telephone Company, with lines over Coshocton and surrounding counties, reorganized at Warsaw by electing J. P. Darling, president; Joseph Finley, vice-president; S. C. Kissner, secretary and manager; James L. Beck, treasurer; W. D. Kissner, auditor.

FINDLEY, OHIO.—At the annual meeting of the Farmers' Mutual Telephone Company the following officers were elected: Cyrus Ockerman, president; E. H. Rosenberg, vice-president; T. T. Robinson, secretary; A. A. Rudicell.

MCCOMB, OHIO.—The Farmers' Mutual Telephone Company held its annual election of officers at McComb recently. The officers elected are: President, Cyrus Ockerman; vice-president, E. H. Rosenberg; secretary, F. F. Robinson; treasurer, A. A. Rudicell; trustees, Louis Brookerman, Steven Otto and Will Vonstein.

SANDUSKY, OHIO.—At the annual meeting of the Standard Telephone Company the following officers were elected: V. H. Stevens, of Dubuque, president; J. L. Marsh, of Decorah, vice-president; O. J. Hager, of Waukon, secretary and treasurer; W. I. Gilchrist, C. A. Brennan, L. A. Hume, directors.

WESTON, OHIO.—The Weston Home Telephone Company has elected the following officers: Sampel Murphy, president; George E. Spencer, treasurer; W. E. DeWese, W. R. Swerline, C. K. Ross, Erin Businger and J. E. Clark, directors.

DELMAR, PA.—The Delmar and Hoytville Telephone Company has elected the following officers: President, Frank H. Marvin, of Antrim; secretary, D. S. Fields, of Delmar; treasurer, John Focht, of Delmar; directors, C. W. Bernauer, Henry J. Mitchell and Herbert Roblyer, of Delmar, and C. C. Miller and Martin Williamce, of Morris.

JOHNSTON, PA.—The Johnston Telephone Company has elected the following directors: Charles Griffith, president; P. F. McAneny, treasurer; Edwin D. Schade, secretary and general manager; Charles J. Mayer, H. H. Weaver, P. S. Fisher, E. J. O'Connor, W. B. Lowman, Wm. H. Smith and James P. Thomas.

LOYALSOCK, PA.—The Loyalsock Telephone Company has elected the following officers: R. H. Rothfus, president; Dr. R. H. Milnor, secretary; F. A. Hayes, treasurer. The line will be extended to Hepburn township.

MANSFIELD, PA.—The Citizens' Mutual Telephone & Telegraph Company has elected these officers: President, W. J. Squires; secretary, W. A. Davey; treasurer, Homer J. Ripley. These directors were chosen: Lewis M. Palmer, L. L. Reynolds, W. H. Hatfield, J. C. Rexford. From 68 subscribers a year ago the company now has 289. Arrangements have been perfected for early extension of the service into Elmira by reciprocal arrangement with the York State Telephone Company, from State Line.

READING, PA.—The Consolidated Telephone Company has elected the following officers: Robert E. Wright, of Allentown, president; C. W. Kelin, of Hazleton, vice-president; S. E. Walen, secretary and general manager; C. M. Y. Keck, treasurer.

SHICKSHINNY, PA.—The Farmers' Telephone Supply Company has elected the following officers: Dr. C. A. Long, president; H. E. Campbell, vice-president; T. B. Harrison, secretary; Major Benscote, treasurer; I. A. Long, H. A. Wolf, B. F. Croop, Robert Shaw and Wilbur Search, directors.

WELLSBORO, PA.—The Farmers' Mutual Telephone Company meeting was held recently. These directors were elected: E. J. Tuttle, of Wellsboro; E. C. Howell, C. H. Harkness and J. F. Haverly, of Cherryflats; T. E.

Bowen and Seth Peake, of Roundtop; W. M. Kehler, Esq., of Blossburg; J. L. Hagar, of Mansfield; A. B. A. Briggs, of Middlebury Center; A. O. Dockstader, of East Charleston; W. W. Bastian, of Liberty Borough, and George F. Curtiss, of Chatham Valley. Mr. Francis Kelley, of West Covington, was elected president, and Mr. L. E. Thompson, of Cherryflats, was re-elected secretary and treasurer.

HUDSON, S. D.—At the annual meeting of the stockholders of the Hudson Telephone Company, held recently, the following officers were re-elected: E. D. Cassill, president; Oscar C. Olson, vice-president; E. R. Buck, secretary, and F. B. Cable, treasurer. The company has been in operation for seven months, has a fine town exchange and 13 miles of country line. Many country extensions will be made during the coming year.

YANKTON, S. D.—The Independent Telephone Company has elected C. H. Dillon, W. H. Edmunds, J. J. Wagner, E. A. Bouska, R. H. Jones, E. A. Bruce and Peter Byrne directors.

CHELSEA, VT.—The Orange County Telephone Company at a meeting held here elected the following directors: C. L. Speare, of West Corin, president; George Crane, of Brookfield, vice-president; R. H. Williams, of West Corin, secretary and treasurer; C. S. Emery, of Chelsea, auditor; E. H. Kenedy, of Chelsea; H. L. Towne, Montpelier; M. W. Chamberlain, Washington; Henry Waldo, East Randolph; Myron M. Daly, Calais. The capital stock was increased from \$10,000 to \$25,000.

RANDOLPH, VT.—The Randolph Telephone Exchange has elected the following officers: President, H. W. McIntyre; secretary and treasurer, Dr. H. H. McIntyre; auditors, Dr. G. W. Scott, Dr. H. W. McIntyre and H. W. McIntyre.

WHEELING, W. VA.—The National Telephone Company has elected the following officers: Henry Schmulbach, president; J. J. Walsh, vice-president; Louis J. Bayba, treasurer; W. C. Handlan, secretary and general manager.

MONROE, WIS.—The Monroe Telephone Company has elected the following directors: W. P. Brag, C. W. Twining, Dr. W. B. Monroe, J. H. Durst and Frank Shriner. \$5,000 worth of new stock will be issued.

MISCELLANEOUS

JEFFERSONVILLE, MICH.—Arrangements are being made by the rural telephone companies in the adjoining towns in Hillsdale County for the formation of the Southern Michigan Telephone Association. The Jeffersonville Telephone Company was organized eighteen months ago and has been very successful.

OIL CITY, PA.—The Petroleum Telephone Company, which has been in the hands of a receiver for some time, has been re-organized by Franklin and Oil City capitalists. An application will be made to court for the discharge of the receivers.

UNDERGROUND

OSWEGO, N. Y.—The common council has granted the right to the Empire State Telephone and Telegraph Company to construct a subway for its wires.

TRENTON, N. J.—Assemblyman Duff has introduced a bill making it compulsory to place all telephone and other wires in the cities of the State underground.



New Construction in the Field



WRAY, COLO.—The Wray Telephone Company proposes to construct a line to Akron.

JACKSONVILLE, FLA.—The business of the Peninsular Telephone Company at Fort Mead has increased to such an extent that the company will probably install an exchange there.

AUDUBON, IA.—The Audubon County Farmers' Mutual Telephone Company contemplate installing an exchange in Audubon to handle their lines.

HOWARD LAKE, MINN.—The Howard Lake Telephone Company, as soon as the weather permits, will construct a new line north and west from town. At a recent meeting, Dr. Moffat was elected secretary and M. M. Wolley, manager.

JASPER, MO.—Judge E. Hubbard and twenty-nine farmers have clubbed together to erect a farmers' mutual line from Jasper to Golden City.

LADDONIA, MO.—A meeting of the telephone companies of Audrain County will be held at Mexico on February 6th, when action will be taken toward establishing a central office here to give connection to all the companies.

DRYDEN, N. Y.—The Dryden Telephone Company will probably construct a line to Freeville in the spring and install an exchange. The company has been recently organized at Virgil, which will connect with the Dryden exchange. P. D. Marcy is president of this company and C. B.

Weiland, secretary. Fifteen farmers in the vicinity of Gee Hill have formed a company which will also connect with Dryden. C. D. Burch is president of this company.

EAST CHATHAM, N. Y.—The New Britain Co-Operative Telephone Company, operating in Canaan and New Lebanon Townships, which was incorporated last spring with a capital stock of \$1,000, will soon extend its line to Brainard. The officers are Smith F. Phillips, president; Dow V. Wadsworth, C. H. Carpenter, A. B. Greenman, W. H. Van Vleck, J. G. F. Wadsworth, treasurer, and J. A. Kelley, secretary.

REEDS MILLS, O.—The Reeds Mills Telephone Company will construct a line to Bloomfield Center and also one to Unionport.

LAMONT, OKLA.—The Lamont Rural Telephone System is planning to construct a metallic circuit line connecting all towns in this vicinity.

PHILADELPHIA, PA.—The Keystone State Telephone & Telegraph Company has begun a general system of renovation along its lines in the county. Two new trunk lines are being constructed to Chester from Philadelphia. The exchange station will be removed from Moore and located in Lansdowne or Darby.

SKAGIT, WASH.—Stephen J. Harmeling, of the Vashon Fruit Growers' Association, and the Skagit Mutual Telephone Company are planning for the construction of telephone lines, to give the fruit growers connection with Skagit, Tacoma and Seattle.

TRADE NOTES

THE ELECTRIC APPLIANCE COMPANY, OF CHICAGO, held its annual banquet recently, at which a series of papers were read by the salesmen and heads of departments, dealing with origin, care and shipment of an order. The taking and shipping of an order would seem to be but a simple matter. Those who listened to this series of papers, however, were impressed with the care and knowledge and thought necessary to properly handle an order to the satisfaction of an up-to-date supply house and of the wideawake customers of to-day.

THE FRANK B. COOK COMPANY, of Chicago, has just issued a catalogue embracing the telephone specialties that it is now offering. The present catalogue is largely devoted to illustrating and describing the protective devices that the company manufactures. Protection for distributing boards, cable heads and terminals are illustrated in full, together with the complete sub-station protector and the line fuse. To these the bulk of the little catalogue is devoted, while the remainder is made up of descriptions of the more common forms of line material.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, reports the following recent shipments: Nappanee, Indiana, 300 capacity; Bevier, Missouri, a 100 capacity addition to the first section installed within the past thirty days; Bunker Hill, Missouri, 100 capacity; South Wayne, Wisconsin, 100 capacity; Gratiot, Wisconsin, 100 capacity; Chatham, Illinois, 100 capacity; Divernon, Illinois, 150 capacity; Winslow, Illinois, 100 capacity. A number of the above orders included complete telephone equipment as well.

CHAS. COOPER & COMPANY, 194 Worth street, New York City, has sent us a very complete price-list of chemicals that exhibits the prices, both wholesale and retail, of several hundred of the more common chemicals used in the arts. Information of this description is exceedingly convenient, particularly to telephone exchange managers who, for the purpose of maintaining local batteries are likely to require considerable quantities of the various chemicals used for such purposes, and we advise the managers of exchanges maintaining local batteries to write to Cooper & Company for the price-list, which they will be glad to supply.

THE AMERICAN SCHOOL OF CORRESPONDENCE, which operates in conjunction with the Armour Institute of Technology at Chicago, Ill., issues a magazine called the *Fulcrum*, in connection with its Auckland, New Zealand, agency. The magazine treats of electrical and general scientific matters and contains much that should interest those who are trying to educate themselves in that far away or any other country. The Auckland, N. Z., agency of the school keeps on file, practically, all of the American scientific periodicals, and many of those published in England for the use of its students, who are at liberty of consulting them at any time, and thus aids substantially in its work of educating the ambitious.

THE TELEPHONE PRINTING COMPANY, of Defiance, Ohio, has issued a little brochure describing the books, blanks and forms that it prepares for use in organizing, conducting and keeping the records and accounts of telephone and toll line companies. This company has made a specialty of this line of work, and has had enough special experience to enable it to furnish its customers with forms and blanks that will exactly suit their needs. Among the blanks that the company prepares are corporation records, stock certificates, lease and rental records, cash books, toll tickets, toll journals, toll station ledgers, monthly check reports, trouble tickets, bills and receipts for toll service and rental receipts. All of these forms and records are prepared with special reference to making them useful to telephone companies.

THE WEST DISINFECTING COMPANY, of 26 East 59th street, New York City, has recently invented and placed on the market a disinfecting device for telephone transmitters. The contrivance is of nicked and polished metal, and is designed to close the opening of the transmitter and at the same time keep the interior of the

mouthpiece, by means of antiseptic fumes which come from a saturated pad, free from bacilli. The liquid which is used to saturate the pad has an exceedingly pleasant odor and is said to be very effective in its work of germ killing. Strange to say, it is not necessary to open the little cover over the transmitter mouthpiece when it is desired to talk, as conversation can be easily carried on while the device is in its normal position covering the mouthpiece. However, in order to get all the benefits of the attachment, it should be opened when talking through the telephone. Doing this becomes as natural as taking down and putting up the receiver. The almost universal and generally promiscuous employment of the telephone has more than once given rise to the suspicion that this useful modern invention is a disseminator of bacilli. Sanitarians and hygienists have cast suspicion upon the transmitter of the telephone, and certain appliances claiming scientific merit have been devised for overcoming the possible dangers of unsanitary condition. The present invention is one that is attracting wide attention.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—1,000 series telephones in the best of condition and ready for immediate delivery, \$4.00 each. Address. C. H. A., care THE AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Building, Chicago, Ill. 127

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

SAVE A DOLLAR OR \$0. Toll Tickets. Your choice of five forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. Gildart Brothers, Albion, Mich. 131

WANTED.—Man with experience, thoroughly competent to take charge of testing room in large telephone factory. State wages expected, also experience. THE VOUGHT-BERGER COMPANY, La Crosse, Wisconsin. 133

FOR SALE.—Telephone system in growing town; 25 year franchise, 100 subscribers, 50 miles toll lines. Paying 20 per cent. Easily pay more by pushing and competent management. Will sell half to party competent to handle the business or will sell all. Good reason for selling. W. O. BEARD, Corning, Ark. 134

POSITION.—Wanted by telephone man with eight years' experience with Bell and Independent companies. Best of references from present and former employers regarding work and character. 26 years of age; married; strictly temperate. Address Box 120, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 120

MANAGER.—A good, live, energetic, capable man of experience wanted to manage a large Independent telephone system in the West. Must be able to invest not less than \$10,000 in the company. Address Box 102, THE AMERICAN TELEPHONE JOURNAL, No. 116 Nassau street, New York City. 102

WANTED.—Position by man with fourteen years' experience, good practical, as well as theoretical, knowledge of the business; associated the past four years with one of the largest Independent companies in the country. Would accept a position in the engineering department of a manufacturing company. Good circuit man and have had installing experience. Territory west of Chicago preferred, and contract required. References given. Address, Box 132, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 132

We hope you won't put off too long the purchasing of your Poles.

You have doubtless had the experience of waiting in vain for the arrival of Poles ordered only at the last minute, when a rival company is about to take the field.

Why not try the opposite plan? "Shop around" now, among all the Pole men you choose. When you're through, then come to us. You'll stay by us.

Try it next time.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

{ We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

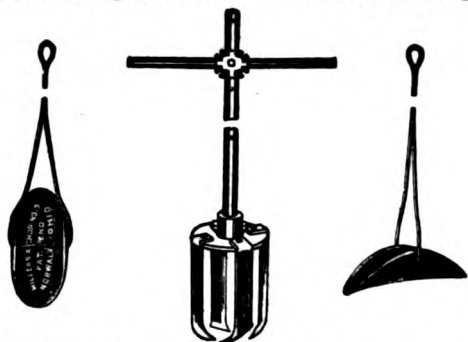
but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

"THEY NEVER PULL UP"

Patented August 25, 1903. Other Patents Pending.



Write for Description and Prices.
THE MILLER ANCHOR CO., Norwalk, Ohio

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.

SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.

MENOMINEE, MICH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

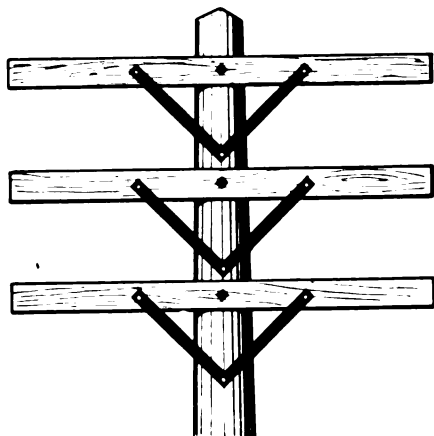
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

PRODUCERS NOT JOBBERS

CEDAR POLES

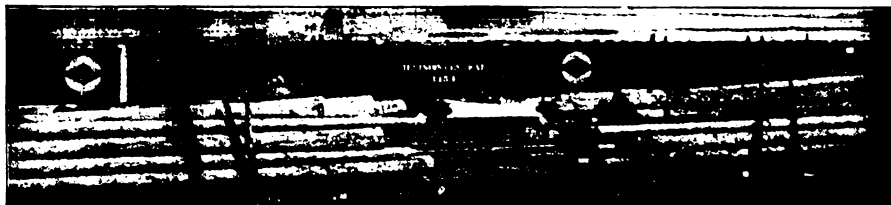
LOWEST PRICES
IN CARLOAD LOTS

**KELLOGG SWITCHBOARD
& SUPPLY CO.**

239 S. GREEN ST. CHICAGO.

Cedar Poles

Large Stock
Prompt Ship-
ment.



LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality . . .

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once: no delays, no "cussing."
TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**

152-158 Lake St., Chicago, Ill.

Factory, Sycamore, Ill.

PRICE LIST AND SAMPLES ON APPLICATION

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND



Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter and complete Telephone Sets. Send for booklet. ♡ ♡ ♡

74 CORTLANDT STREET,

NEW YORK CITY

The Morse
Cedar
Co.
**CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.**
Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES
POLES
POLES
POLES
YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.
FRANCIS BEIDLER & CO.
459-519 W. 22d St.
CHICAGO, ILL.



J. W. Middleton & Co.

PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♡ ♡ ♡

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

ELECTRICAL ENGINEER
AND CONTRACTOR :: ::
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL. \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,

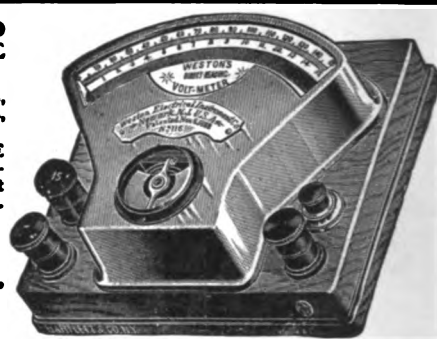
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

SIGNS OF THE TIMES.—

The American Telephone Journal is growing better with each issue. Yet the price still remains the same, 52 issues for 100 cents. Hadn't you better send a dollar now?

IT'S SO EASY TO TEST

with one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.

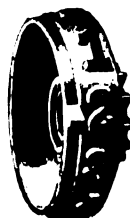
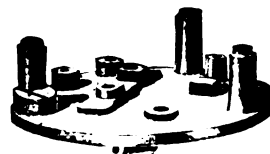


LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

These Pieces Were Not Turned, Bored, Reamed, or the Gears Cut--



each piece was made complete in one operation and they are ready for assembling without further work.

Each piece consumed a couple of seconds, or so, in its making. They are "Die Castings" from Franklin. They are cast in steel dies and they are accurate down to .001 of an inch and every one alike.

Your round-about-way of machining can be done away with by using Franklin Castings.

May we send you a couple of examples of the work?

Franklin Mfg. Company

200 S. Geddes St.

SYRACUSE, N. Y., U. S. A.

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects. Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

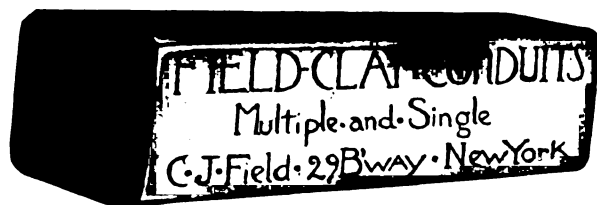
A B C of the Telephone.....\$1.00 By J. E. Homans.	The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
Diagrams of Electrical Connections......50	Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
Induction Coils.....\$1.00 By H. S. Norrie.	Practical Electrica. This volume could rightly be called an Electric Encyclopedia......75
Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	Systematic Treatise on Electrical Measurements.....\$1.00 By H. C. Parker.
Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	Electrical Catechism.....\$2.00 By George D. Shepardson.
Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	American Telephone Practice.....\$3.00 By Kempster B. Miller.
The Electric Telephone.....\$6.00 By G. B. Prescott.	How to Make and Use the Telephone.....\$1.00 By George H. Cary.
The Inspector and Troubleshman.....\$1.00 By A. E. Dobbs.	The Telephone......50 By Prof. A. E. Dolbear.
Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	The Telephone, the Microphone and the Phonograph..... By Count Dumenel.
Practical Features of Telephone Work......75 By A. E. Dobbs.	Practical Information for Telephonists..... By T. D. Lockwood.
The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	Elementary Treatise on Electric Batteries.....\$2.50 By A. Niandet. Translated by L. M. Fishback.
Small Accumulators......50 By Percival Marshall.	Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	Conduits for Telephone Work......50 By Arthur Vaughan Abbott.
Induction Coils.....\$1.00 By G. E. Bonney.	Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	Patents and How to Make Money Out of Them.....\$1.25 By W. B. Hutchinson.
Electric Instrument Making for Amateurs......50 By S. R. Bottone.	Wireless Telegraphy.....In Press. By C. H. Sewall.
Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
The Telephone.....\$1.00 By William J. Hopkins.	A Practical Guide to the Testing of Insulated Wires and Cables.....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal

116 Nassau Street,
CITY OF NEW YORK



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, **and at much less cost.**

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tared by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,
KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

Bituminized Fiber Conduit

FOR UNDERGROUND CONSTRUCTION

ELECTROLYSIS-PROOF WATER-PROOF

A Smooth Laminated Insulator of Unchanging Durability

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate.

The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty percentum of freight and handling charges and twenty percentum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

170 Broadway, New York, N. Y.

336 Macy Street, Los Angeles, Cal.

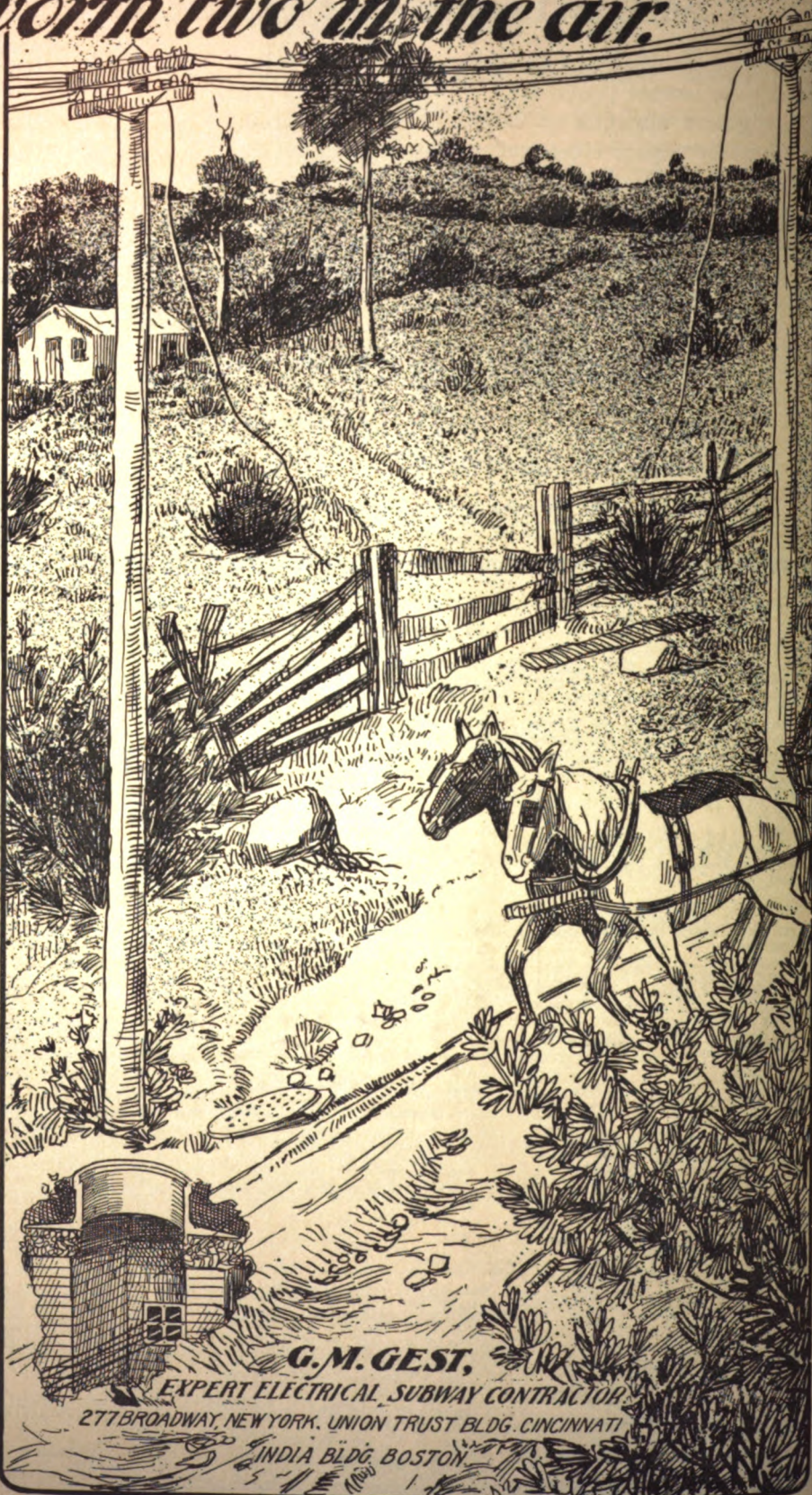
822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the WESTERN ELECTRIC COMPANY

ADVERTISERS' DIRECTORY—Concluded

<p>Sand Point Cedar Co., Sand Point, Idaho.</p> <p>Sterling, W. C., & Son, Monroe, Mich.</p> <p>Townsend Cedar & Supply Co., Chicago, Ill.</p> <p>Valentine-Clark Co., Chicago, Ill.</p> <p>Wisconsin Timber & Land Co., Mattoon, Wis.</p> <p>Worcester, C. H., Co., Chicago, Ill.</p> <p>POWER PLANTS.</p> <p>Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>PROTECTORS.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Cook, Frank B., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>Sterling Electric Co., Lafayette, Ind.</p> <p>PAY STATIONS.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>SEALS.</p> <p>Middleton & Co., J. W., Chicago, Ill.</p> <p>SIGNS.</p> <p>Ingram-Richardson Mfg. Co., Beaver Falls, Pa.</p> <p>SOLDER, RESIN CORE.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>STATIONERY.</p> <p>Shaw-Walker Company, Muskegon, Mich.</p> <p>Telephone Printing Co., Defiance, Ohio.</p> <p>STEEL.</p> <p>Leslie A. C., & Co., Montreal, Can.</p>	<p>STOCK CERTIFICATES.</p> <p>Middleton & Co., J. W., Chicago, Ill.</p> <p>SWITCHBOARD DROPS.</p> <p>Columbia Electric Co., McCordsville, Ind.</p> <p>SWITCHBOARDS.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Automatic Electric Co., Chicago, Ill.</p> <p>Central Tel. & Elect. Co., St. Louis, Mo.</p> <p>Conn. Tel. & Electric Co., Meriden, Conn.</p> <p>Eriesson Telephone Co., N. Y.</p> <p>Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>International Telephone Mfg. Co., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>Monarch Tel. Mfg. Co., Chicago, Ill.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>North Electric Co., Cleveland, O.</p> <p>Sterling Electric Co., Lafayette, Ind.</p> <p>Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>Swedish-American Tel. Co., Chicago, Ill.</p> <p>Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONES.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Automatic Electric Co., Chicago, Ill.</p> <p>Central Tel. & Elect. Co., St. Louis, Mo.</p> <p>Chicago Writing Machine Co., Chicago, Ill.</p> <p>Connecticut Telephone & Electric Co., Meriden, Conn.</p> <p>Couch, S. H., Co., Boston, Mass.</p> <p>Electric Appliance Co., Chicago, Ill.</p>	<p>Eriesson Telephone Co., N. Y.</p> <p>Fahnestock Transmitter Co., New York.</p> <p>Holtzer-Cabot Electric Co., Brookline, Mass.</p> <p>International Telephone Mfg. Co., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>Monarch Telephone Mfg. Co., Chicago, Ill.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>North Electric Co., Cleveland, O.</p> <p>Sterling Electric Co., Lafayette, Ind.</p> <p>Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>Swedish-American Tel. Co., Chicago, Ill.</p> <p>Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONE BOOTHS.</p> <p>Yesbera Manufacturing Co., Toledo, Ohio.</p> <p>TELEPHONE HOLDER.</p> <p>Chicago Writing Machine Co., Chicago, Ill.</p> <p>TELEPHONE SUPPLIES.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Automatic Electric Co., Chicago, Ill.</p> <p>Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>Bissell Co., The F., Toledo, O.</p> <p>Central Tel. & Elect. Co., St. Louis, Mo.</p> <p>Chicago Writing Machine Co., Chicago, Ill.</p> <p>Columbia Electric Co., McCordsville, Ind.</p> <p>Connecticut Telephone & Electric Co., Meriden, Conn.</p> <p>Couch, S. H., Co., Boston, Mass.</p> <p>Electric Appliance Co., Chicago, Ill.</p> <p>Eriesson Telephone Co., N. Y.</p> <p>Fahnestock Transmitter Co., New York.</p> <p>Holtzer-Cabot Elec. Co., Brookline, Mass.</p>	<p>International Telephone Mfg. Co., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>Leslie, A. C., & Co. Montreal, Can.</p> <p>Monarch Tel. Mfg. Co., Chicago, Ill.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>North Electric Co., Cleveland, O.</p> <p>Sterling Electric Co., Lafayette, Ind.</p> <p>Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>Swedish-American Tel. Co., Chicago, Ill.</p> <p>Vought-Berger Co., La Crosse, Wis.</p> <p>Yesbera Mfg. Co., Toledo, O.</p> <p>TERMINALS.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Cook, Frank B., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>McIntire Co., C., Newark, N. J.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>Sterling Electric Co., Lafayette, Ind.</p> <p>TRANSMITTER ARMS.</p> <p>Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>WIRE.</p> <p>American Electric Tel. Co., Chicago, Ill.</p> <p>Bissell Co., The F., Toledo, O.</p> <p>Chicago Insulated Wire Co., Chicago, Ill.</p> <p>Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>Nagel, W. G., Electric Co., Toledo, O.</p> <p>National Wire Corporation, New Haven, Conn.</p> <p>Okonite Co., New York.</p> <p>Roebbing's Sons Co., John A., Trenton, N. J.</p> <p>Scovill Mfg. Co., Chicago, Ill.</p> <p>Standard Underground Cable Co., Pittsburg, Pa.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,
EXPERT ELECTRICAL SUBWAY CONTRACTOR
277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI
INDIA BLDG. BOSTON

==USERS OF==

“CAMP DUCT”

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK



LEICH FOUR-PARTY SELECTIVE TELEPHONES

THOUSANDS IN SUCCESSFUL OPERATION

CENTRAL ENERGY OR MAGNETO

**No Springs to Adjust—No Relays
—Condensers in Circuit to
Stop the Battery Flow**

**A Few of the Larger Exchanges
Now Using the System**

Mansfield, O.	Youngstown, O.
Massillon, O.	Lima, O.
Trenton, N. J.	Ft. Worth, Tex.
Terre Haute, Ind.	Jackson, Tenn.
Reading, Pa.	Allentown, Pa.
Tampa, Fla.	Brazil, Ind.
Kewanee, Ill.	Springfield, Mo.

**ONLY ALTERNATING CURRENTS
USED FOR RINGING**

**The American
Electric Telephone Company
CHICAGO**



THE AMERICAN TELEPHONE JOURNAL

Would a Telephonist

pay one dollar for a paper if it wasn't good and useful? No. Would he renew his subscription if the paper were of no value? No. Here's a letter with a moral:

Will you please tell me when my subscription expires. I wish to take your magazine for another year, as I like it better than anything I have ever read.

A. Blackmon,
Gowanda, N. Y.

The moral is: "Fifty-two numbers of the Best Journal for One Dollar." May we have your Name? Now?

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—FEBRUARY 13, 1904—CHICAGO Number 7

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

EVOLUTION OF THE INDEPENDENT TELEPHONE.....By B. F. Wasson

A QUERY—MEASURED SERVICE AND PARTY LINES

THE TELEPHONES ON THE PRUSSIAN-HESSIAN STATE RAILWAYS

THE CUYAHOGA'S ANNUAL SHOWING

RESULTS OF THE KANSAS CONVENTION

POLE TAX DEVOTED TO THE CARE OF POLES

The Operating Field:

ANNUAL CONVENTION OF THE IOWA TELEPHONE ASSOCIATION

ORANGE AND SUSSEX MEETING

BELL MUST RENDER AN ACCOUNTING

A TOLL ASSOCIATION IN THE SOUTH

M. TETU ASSISTS AT KANSAS CITY

TELEPHONE COMPETITION PAYS

THE FORT WORTH COMPANY KEPT BUSY

THE SWEDS WHO WANTED A TELEPHONE—BUT

MUST PAY FOR CARRYING WIRES ON BROOKLYN BRIDGE

SWITCHING CHARGE INFORMATION

THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 112.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

The best illustration of that time worn saying "Money talks" is found by spending a few more cents per phone and getting our "Eaco Telephones that talk."

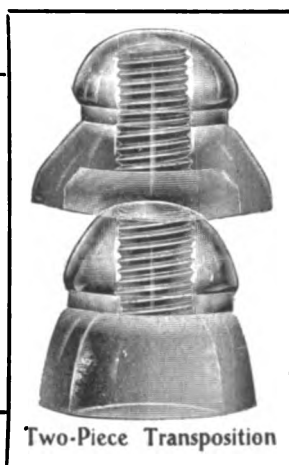
A talkative talker in every sense and the few cents extra investment is readily discernible to the man who knows "points" in telephones. The transmitter and receiver are important points, but there must be something back of them, and the added cost over "cheap" telephones is found not only in the two talkative points but also in the backing—thus do we multiply the talk. Look in the battery box and you find 1900 dry batteries.

Short, crisp pointlets from our telephone typewriter will aid in the digestion of the thought of "paying more." Correspondence suggested.

ELECTRIC APPLIANCE COMPANY, CHICAGO

THE STANDARD "HEMINGRAY"

ALL WITH THE "PATENT DRIP PETTICOATS."



THE HEMINGRAY-GLASS CO.

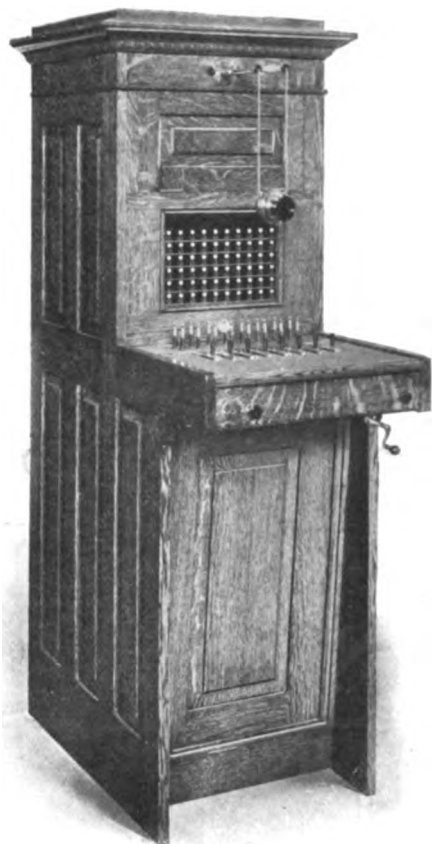
Office, Covington, Ky.

Factory, Muncie, Ind.

ESTABLISHED 1848.

CENTRAL ENERGY SWITCHBOARDS

20 to 18,000 Lines Capacity

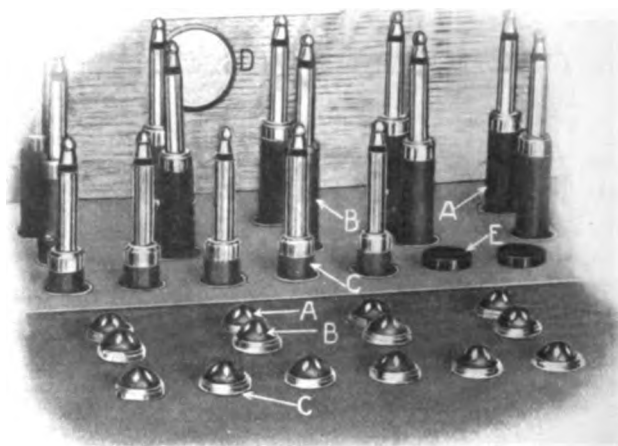


The accompanying illustration shows one of our standard 60 line lamp signal switchboards known as Cabinet No. A-959. These small boards have all the modern improvements possessed by our large switchboards.

The workmanship is of course the very best.

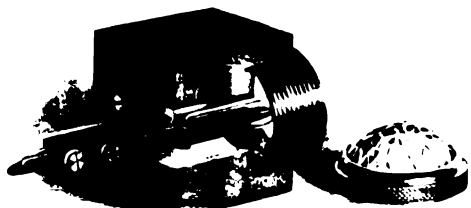
The design of the various parts has been worked out so carefully that it is not at all difficult to maintain a board of this type. The operation is so simple that it is no more difficult to operate than an ordinary magneto drop switchboard.

When the quality of the service that this type of board will give is considered the cost of operating is a very small item.



PLUGS AND SUPERVISORY LAMPS.

- A—Answering plugs and associated supervisory lamp signals.
- B—Calling plugs and associated supervisory lamp signals.
- C—Plug ended transfers and associated lamp disconnect signals.
- D—Pilot lamp. E—Plug hole stops.



PILOT LAMP—showing method of mounting.



PILOT LAMP AND LAMP JACK (Parts).

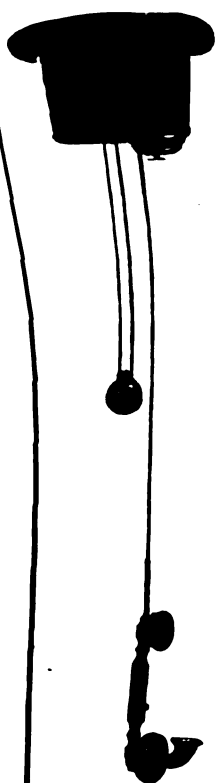
We have published a Bulletin on Central Energy Switchboards that contains an immense amount of information as well as illustrations of the finest switchboards put on the market. Mailed to telephone companies upon request.

Write for Bulletin No. 8-B.

Stromberg-Carlson Telephone Mfg. Co.

**Gen'l & Eastern Sales Office,
ROCHESTER, N. Y.**

**Sales Dept.,
CHICAGO, ILL.**



Get a Pendant

FOR THE
Office Store Residence

WRITE US NOW



*Efficient, Durable
Elegant, Inexpensive
Portable and Adjustable*

The Vought-Berger Company
Makers of High Grade Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN



All Right for Quality

Well Balanced Equipment

**TELEPHONES
THAT NEVER
WEAR OUT**

TRY ME

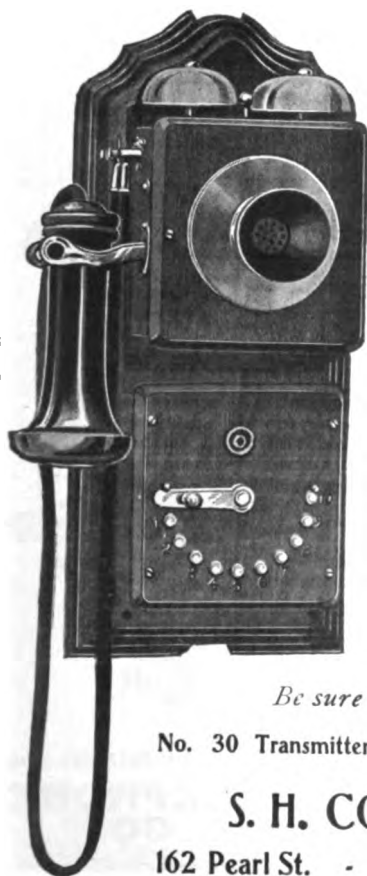
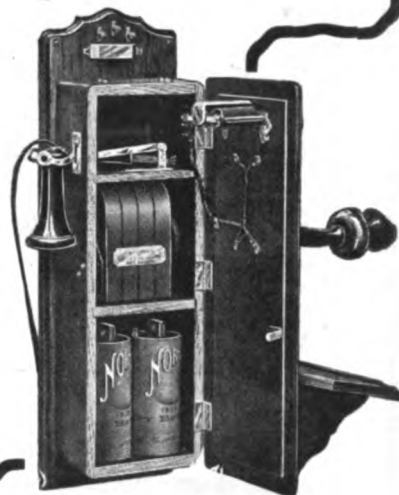
WRITE
TO-DAY

**THE
NORTH
ELECTRIC
CO.**

CLEVELAND,
OHIO, U. S. A.

156 St. Clair St.
166

C N 160



**No. 12 Telephone
for Interior Systems**

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

**Send us a
trial order**

Don't fail to send for bulletin 6, describing No. 12 Telephone.

We make a lot of good things.

Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

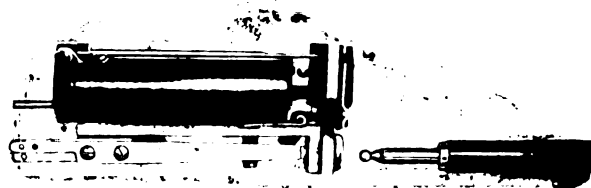
S. H. COUCH CO.

162 Pearl St. - BOSTON, MASS.

**INTERNATIONAL
Telephone Mfg. Co.**

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**

CHICAGO, ILL.

Multiple Switchboards

**T
E
L
E
P
H
O
N
E
S**

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

**T
E
R
M
I
N
A
L
S**



PROTECTIVE DEVICES



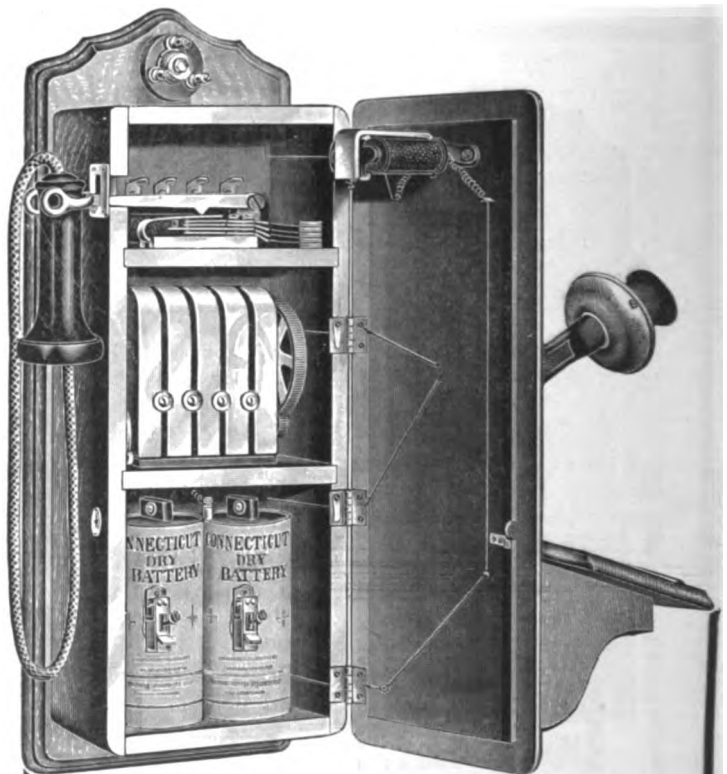
The Survival of the Fittest

Takes place in every city or town where two telephone companies compete for patronage. **That company which gives the best service will survive.** The best telephone service in the world to-day is Automatic, and we installed the exchanges which give it.

From these facts draw a moral.

Automatic Electric Co.

CHICAGO, U. S. A.



Strongest and best Telephone on earth

The special quantity price will interest you

**CONNECTICUT TELEPHONE
AND ELECTRIC CO.**

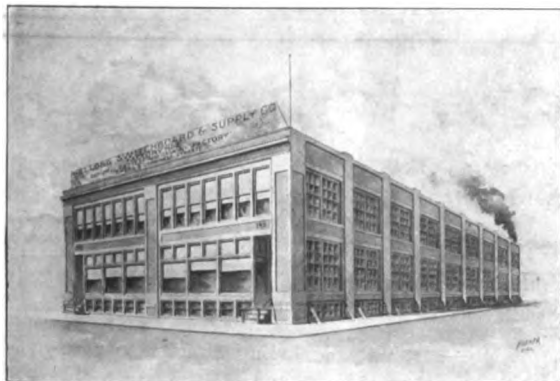
MERIDEN, CONN., U. S. A.

Kellogg Switchboard and Supply Company

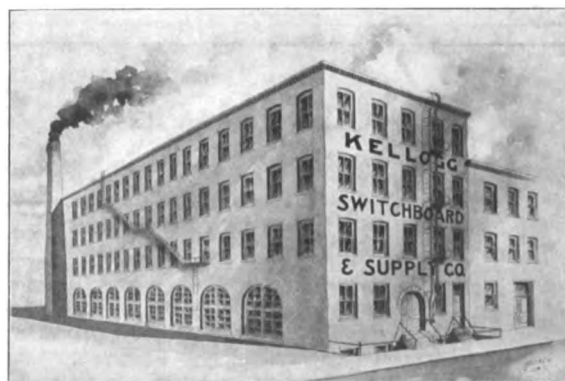
CHICAGO, ILL.



MAIN FACTORY AND GENERAL OFFICES.
CONGRESS AND GREEN STREETS.



FACTORY NO. 2.



GENERAL WAREHOUSE.

The Kellogg Switchboard and Supply Company have just rented and equipped Factory No. 2 with 34,000 square feet of new floor space. This space, together with our main factory, is entirely devoted to switchboards and telephones. We have also increased our warehouse capacity to 35,000 square feet, and have filled same with a complete stock of our standard make of telephones. Our entire plant equipped throughout with modern machinery and manned by the most expert mechanics affords unexcelled facilities for the manufacture of the highest grade of telephone apparatus.

Our increased factory capacity enables us to make everything not in stock at very short notice. We are prepared to fill from stock all orders for telephones of standard types. Orders for magneto or common battery switchboards will be filled with unusual despatch.

We manufacture no inferior grades. Our apparatus as to quality, durability and beauty will be strictly maintained.
Write for prices.

**KELLOGG SWITCHBOARD and SUPPLY COMPANY,
CHICAGO**

346 Broadway
New York

Electric Building
Cleveland

Keystone Telephone Building
Philadelphia



MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.
14 So. Clinton Street CHICAGO, ILL.

American Telephone Practice

By KEMPSTER B. MILLER, M. E.

518 large pages, profusely illustrated with 380 diagrams and cuts of apparatus

\$3.00

A book for the telephone man. It is an encyclopedia of useful information concerning telephony. It gives complete specifications, enabling you to intelligently order apparatus from manufacturers, and to properly supervise the installation of an exchange, large or small.

It describes in simple language the theory and practice of modern telephony, including circuits, mechanical construction and operation of telephones and switchboards.

A complete description is given of storage batteries, their care and maintenance; of aerial and underground line construction, and, in fact, all the important matters which telephone men need to know.

Sent Prepaid on Receipt of Price by AMERICAN TELEPHONE JOURNAL



INDEPENDENT
LOCAL
AND
LONG DISTANCE
TELEPHONE

All the big Companies
use them!

ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.



TELEPHONE
LOCAL
LONG DISTANCE
PAY STATION

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

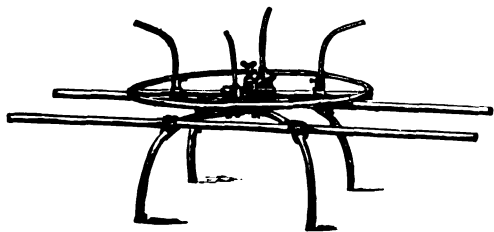
"REMY" BRAND

A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 103 Randolph St., Chicago, Ill.

READY PAY OUT REELS



Send for Prices and descriptive matter.

We also manufacture Construction Tools. Secure our prices on Cable and Telephone Supplies.

The W. G. Nagel Electric Co., Toledo, O.

ADVERTISERS' DIRECTORY

American Conduit Co.....	37	Electric Appliance Co.....	3	Klein, Mathias, & Sons.....	33	Roebbing's, John A., Sons Co....	11
American Electric Tel. Co....	40	Elkin Machine Co.....	33	Leslie, A. C., & Co.....	8	Sand Point Cedar Co.....	30
Am. School of Correspondence...	—	Ericsson Telephone Co.....	10	Lindsley Brothers Co.....	32	Scovill Mfg. Co.....	2
American Vitriified Conduit Co...	39	Fahnestock Transmitter Co.....	33	McIntire, C., Co.....	36	Shaw-Walker Co.....	12
Automatic Electric Co.....	6	Field, C. J.....	36	Maltby Lumber Co.....	29	Standard Underground Cable Co...	12
Barr, W. J., Mfg. Co.....	12	Fowler, John H.....	32	Michigan Cedar Co.....	33	Stanton L. W.....	34
Beidler, Francis & Co.....	33	Franklin Mfg. Co.....	35	Middleton, J. W., & Co.....	34	Sterling, W. C., & Son.....	33
Bissell Co., The F.....	11	Franklin Rolling Mill & Fdy. Co...	31	Miller Anchor Co.....	—	Sterling Electric Co.....	6
Butterfield, J. F.....	34	Gest, G. M.....	38	Monarch Telephone Mfg. Co.....	8	Stromberg-Carlson Telephone Mfg.	—
Camp, The H. B. Co.....	39	Hemingray Glass Co.....	3	Morse Cedar Co.....	33	Co.....	4
Central Telephone & Electric Co...	—	Holtzer-Cabot Electric Co.....	—	Nagel, W. G., Electric Co.....	9	Swedish-American Tel. Co.....	12
Connecticut Teleph. & Electric Co...	6	Huebel, C. J., & Co.....	29	National Wire Corporation.....	11	Telephone Printing Co.....	33
Chicago Insulated Wire Co.....	33	Hyde, W. H., & Co.....	34	New Haven Novelty Machine Co...	2	Townsend Cedar & Supply Co....	32
Chicago Writing Machine Co.....	—	Illinois Electric Specialty Co....	10	North Electric Co.....	5	Valentine Clark Co.....	30
Cohn & Bock.....	33	Imperial Finance & Cons. Co....	34	Nungesser Electric Battery Co....	—	Vought-berger Co.....	5
Columbia Electric Co.....	—	Ingram-Richardson Mfg. Co.....	8	Okonite Company.....	34	Wanted, Situations, etc.....	112
Connecticut Teleph. & Electric Co...	—	Index of the Technical Press.....	—	Pacific Coast Pole Co.....	30	West Disinfecting Co.....	—
Cook, Frank B.....	—	Inland Steel Co.....	32	Pignolet, L. M.....	35	Weston Electrical Instrument Co...	34
Couch, S. H. Co.....	5	International Telephone Mfg. Co...	5	Pittsburg & Lake Superior Iron Co...	29	Wisconsin Timber & Land Co....	33
Crumb, W. H. Co.....	34	Kellogg Switchboard & Supply	7	Pittsburg Sewer Pipe & Conduit	36	Worcester, C. H., Co.....	29
Cunningham Iron Co.....	36	Co.....	—	Co.....	—	Yesbera Mfg. Co.....	—
Dickey Clay Mfg. Co., W. S.....	36	Bissell Co., The F., Toledo, O.	—	CABLE SLEEVES.	—	Cunningham Iron Co., Boston,	—
ANTISEPTIC ATTACHMENT.	—	Chicago Insulated Wire Co., Chi-	—	Nagel, W. G., Electric Co., To-	—	Mass.	—
West Disinfecting Co., N. Y.	—	cago, Ill.	—	ledo, O.	—	Field, C. J., New York.	—
BATTERIES.	—	Kellogg Switchboard & Supply	—	New Haven Novelty Machine Co.,	—	Gest, G. M., Cincinnati, O.	—
Electric Appliance Co., Chicago,	—	Co., Chicago, Ill.	—	New Haven, Conn.	—	Nagel, W. G., Electric Co., To-	—
Ill.	—	Nagel, W. G., Electric Co., To-	—	CARD INDEX SYSTEMS.	—	ledo, O.	—
Illinois Electric Specialty Co.,	—	ledo, O.	—	Shaw-Walker Co., Muskegon,	—	Pittsburg Sewer Pipe & Conduit	—
Chicago, Ill.	—	National Wire Corporation, New	—	Mich.	—	Co., Pittsburg, Kan.	—
Nungesser Electric Battery Co.,	—	Haven, Conn.	—	CLIMBERS.	—	W. S. Dickey Clay Mfg. Co.,	—
Cleveland, O.	—	Okonite Co., New York.	—	Klein & Sons, Mathias, Chicago,	—	Kansas City, Mo.	—
Stromberg-Carlson Tel. Mfg. Co.,	—	Roebbing's Sons Co., John A.,	—	Ill.	—	CONNECTORS.	—
Chicago, Ill.	—	Trenton, N. J.	—	Nagel, W. G., Electric Co., To-	—	Cook, Frank B., Chicago, Ill.	—
BONDS.	—	Standard Underground Cable Co.,	—	ledo, O.	—	McIntire Co., C., Newark, N. J.	—
J. W. Middleton & Co., Chicago,	—	Pittsburg, Pa.	—	CONDUITS.	—	Nagel, W. G., Electric Co., To-	—
Ill.	—	Stromberg-Carlson Tel. Mfg. Co.,	—	American Conduit Co., Chicago,	—	ledo, O.	—
BRASS.	—	Chicago, Ill.	—	Ill.	—	CONSTRUCTION SUPPLIES.	—
Scovill Mfg. Co., Chicago, Ill.	—	CABLE HANGERS.	—	American Vitriified Conduit Co.,	—	American Electric Tel. Co., Chi-	—
BOOTH.	—	Bissell Co., The F., Toledo, O.	—	New York.	—	cago, Ill.	—
Yesbera Mfg. Co., Toledo, O.	—	Cook, Frank B., Chicago, Ill.	—	Camp Co., The H. B. New York.	—	Electric Appliance Co., Chicago,	—
CABLES.	—	Nagel, W. G., Electric Co., To-	—		—	Ill.	—
American Electric Tel. Co., Chi-	—	ledo, O.	—		—	Franklin Mfg. Co., Syracuse, N.Y.	—
cago, Ill.	—	Standard Underground Cable Co.,	—		—		—
	—	Pittsburg, Pa.	—		—		—

WANT AND FOR SALE ADVERTISEMENTS, PAGE 112.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

SUBSCRIPTION BLANK

Out this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

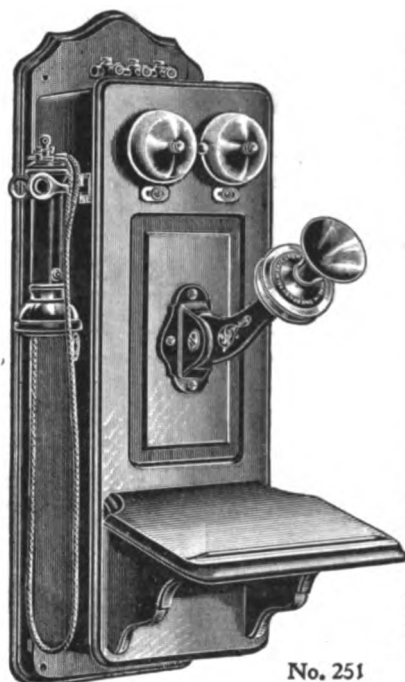
Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....

Ericsson Telephone Company

STRICTLY INDEPENDENT



No. 251

ERICSSON TELEPHONE COMPANY

296 Broadway, New York City

MANUFACTURERS
AND IMPORTERS OF
**High-Grade
Telephones
AND
Telephone
Parts...**

FOR **MAGNETO
AND
COMMON
BATTERY**

Ericsson Telephones are efficient, durable and of superlative quality. Do you want the **best**?

Send for booklet and enclose 1c. stamp for latest laughter provoking novelty.

ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

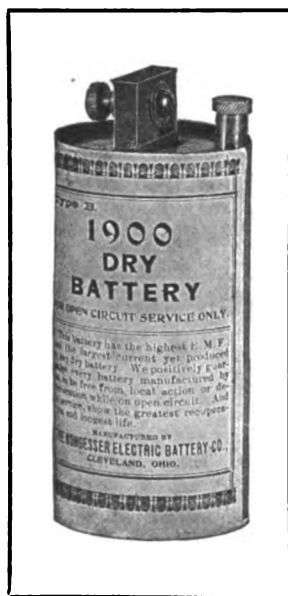
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

*Complete Stock
Always on Hand*

ILLINOIS ELECTRIC CO.,

239 and 241 MADISON ST.
CHICAGO, ILL.

Distributors of Telephone Supplies and Construction Material

Telephone Cable on Hand

Quantity	Length	Pairs	Gauge	Wrapping	Capacity	Lead	Tin
1	300 ft.	20	20	D. W.	.10	$\frac{3}{32}$	No
1	20 ft.	50	20	D. W.	.10	$\frac{3}{32}$	No
1	365 ft.	100	22	D. W.	.12	$\frac{7}{64}$	No
1	125 ft.	150	22	D. W.	.10	$\frac{1}{8}$	1%
1	600 ft.	150	22	D. W.	.12	$\frac{3}{32}$	No
1	416 ft.	200	20	D. W.	.10	$\frac{1}{8}$	No
1	291 ft.	300	20	D. W.	.10	$\frac{1}{8}$	3%

Bulletin 221
sent prepaid
on request.

Write for Prices

Shipments
made from
Toledo stock.

Write for Prices

1—length 5000 feet, on one reel, Ext a High Strength, Steel Strand $\frac{3}{8}$ in., double galvanized, per C feet, \$5.50.

After a most strenuous effort we have succeeded in getting just
a little ahead of orders on our No. 19 Green and Black Duplex.

THE F. BISSELL COMPANY.
TOLEDO, O.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

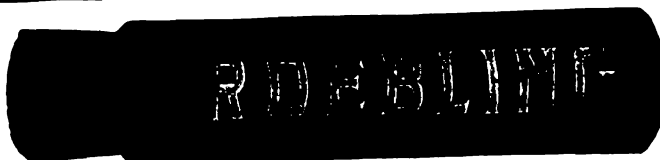
THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK CHICAGO BOSTON DE KALB
KANSAS CITY NEW HAVEN SAN FRANCISCO

Insulated
Electrical
Wires and Cables



Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

YOU WILL FIND



**SWEDISH
AMERICAN
APPARATUS**

ALL OVER THE COUNTRY

There's a Reason. *Get our Prices and Descriptive Matter.*

SWEDISH-AMERICAN TELEPHONE CO., Chicago, Ill.

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND

**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insu-
lated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON.

NEW YORK.

PHILADELPHIA.

CHICAGO.

SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, FEBRUARY 13, 1904

NUMBER 7

EVOLUTION OF THE INDEPENDENT TELEPHONE

By B. F. WASSON, CLINTON, ILLINOIS.

THIS is a subject that has taken volumes to explain; therefore we will confine this article to the exhibit that is to be given at the World's Fair at St. Louis, beginning April 1. This exhibition will depend largely on the telephone men of the United States, inasmuch as we must rely upon them for different articles used when the Independent people commenced operation. At the Inter-State Telephone Convention, held in Chicago in the early part of December by representatives from nine States, it was decided by the members to carry out the plan of making an exhibit, each company furnishing some curio and sending it to us at Clinton, Ill., where the Farm & City Telephone Company agrees to bear the expense of making this exhibit in the space already allotted for that purpose in the Electricity Building.

Up to the present time there have been a great many articles received, but the telephone men must, if they want to make this a success, send in their articles not later than March 1st, and the sooner the better. We have a space of five hundred square feet, and expect to have this space well filled. Among some of the collections that are now gathered is a telephone furnished by N. E. Liggitt, of Marysville, Ohio, which was captured by George P. Zwernes, August 3d, 1898, at Porto Rico, from a planter's residence, during the Spanish-American War. This telephone consists of two receivers, mounted on two heavy rings, as will be seen in the upper left hand part of the photograph; the transmitter consists of a row of carbon pencils placed under a thin board. The receivers are of the double pole type, and will hold up two pounds.

We also have a number of different kinds of the acoustics which were the earliest type of the Independent telephone. We also have received the Harrison transmitter, the coffin box receiver, several different types of wooden shell receivers, fifteen different kinds of transmitters, the arm rest telephone that was put out before the Watson patent expired, a section of the Utica fire alarm board that was used by the Clinton people for about six years. Mr. William Hubbard, of Elgin, Ill., one of the earliest Independent Telephone men, has a fine collection for us that will add wonderfully to this exhibit.

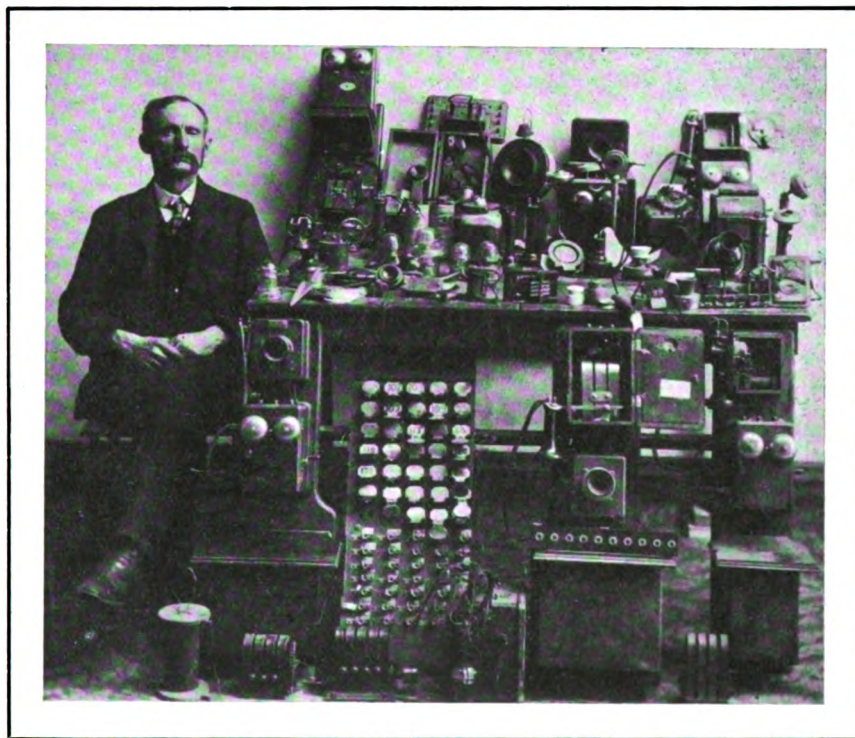
The photograph shows but very few of the articles that are on hand. We find that there are hundreds, and even thousands, of articles that would help greatly to show the evolution of the Independent Telephone. If the parties possessing them will just send them in with their history they will be placed on exhibit. By request any article will be returned without expense to the sender. Do not put this off but send them in at once, so we may know what to depend on. All these small articles and those which are valuable will be mounted in show cases, and other articles will be placed upon the wall in room especially provided for them. At the St. Louis World's Fair will be people from every part of this country, and, in fact, from every part of the globe. This exhibit of primitive telephone apparatus will be one of the most interesting at the Exposition. Everyone will be interested in it, because everyone now uses telephones. This exhibit will show at a glance the history and the evolution of telephone systems; how they have been built up from the crudest apparatus possible to their present high state of efficiency.

The exhibit will also serve to stimulate interest in the Independent telephone business on the part of those citizens of our country who have, unfortunately for themselves, not been blessed with the advantages accruing from active competitive telephone systems.

It will show all such the almost insurmountable obstacles met and overcome by the Independent, spurred on by a desire for better telephone service at lower rental. And it will give them a confidence in Independent telephony that could not be gained by pages of printed matter.

Even the best friends of the Independents, the exhibit will be interesting, for it will renew their interest in the splendid conquests we are making and refresh their minds with memories of the apparatus and service of the days before the advent of competition and the magnificent apparatus and systems at their service as one result of such competition.

These are only a few of the many reasons that Independent operators should use every effort to make this telephone exhibit a success; to enumerate all of them would take more room than a page of this paper affords.



A Portion of the Exhibit That Has Already Been Collected.

A QUERY—MEASURED SERVICE AND PARTY LINES.

THE following query has been sent to us by one of our subscribers, who wishes an impartial opinion on the question. The subject is of such immediate interest that we feel that it is well deserving of a position in the body of our paper.

Our company now has no party lines. All subscribers have an individual metallic circuit. Would you advise our using party lines? What is your opinion of measured service?

(On another page of this issue will be found President Dickson's report to the Cuyahoga Company stockholders, and in it he shows himself an advocate of party lines and measured service.

PARTY lines *vs.* lines and multiple switchboards *vs.* transfer systems, have formed two great battlegrounds on which the telephonists of the world have arrayed themselves against each other, and have fought wordy battles without number. The controversy of the multiple board has largely worn itself out but the party line is still imminent, and is now exciting the keenest attention. In the past, many of the highest authorities in the art have held that party line service was inexpedient and that subscribers should be offered nothing but individual lines. This seems to be too sweeping an assertion, nor is it a position that can be maintained any more than it would be practical for a railway company to assume that it must furnish only Pullman cars, and that everybody that could not afford an extra fare should be compelled to walk. Telephonists of all classes are beginning to see that it is necessary to offer different kinds of service, each of which would be peculiarly fitted to a particular class of subscribers.

To offer a large business house in the middle of a great city, whose daily calls can be counted by scores, party line service would be foolish in the extreme, and it is, perhaps, equally unwise to insist that a small subscriber in a residential district, whose calls perhaps hardly average one per day, must take a single line or be without a telephone. The large business house perhaps must be supplied with several single lines in order that it may transact its business with reasonable promptness. On the other hand, a group of a dozen or more subscribers whose total daily traffic does not exceed ten or fifteen calls can, with perfect satisfaction, be grouped upon one circuit. The business user demands the service, which is far more extensive, and consequently costs far more than the small user. It is right that he should pay a greater tariff; contrariwise, it would be beyond the means of many small users to pay the charges which are necessary to maintain a single circuit, and as their business can be equally well accomplished by a polystation outfit they should certainly be given the benefit of this type of insulation. The railway case is exactly parallel, as some people wish to ride in a Pullman, and should be supplied with such a car; yet others prefer the emigrant train, and ought to be accommodated therein. Telephony is peculiar in one respect, in that a large telephone business costs more to operate than a small one.

The party line offers a probable solution to this difficulty, for as the exchange extends, particularly into the outskirts, it meets a very large class of patrons whose traffic is small and to whom

a multistation service is perfectly acceptable. This train of events is now being recognized by the manufacturers, and most of the prominent makers are offering and advocating party line systems of various descriptions.

The North Electric Company, in their most recent catalogue, print the following paragraphs:

"Few Independent telephone men realize that measured service and party lines, together with multiple distribution in the cable plant, very largely overcome that telephone anomaly—the increased unit cost of a growing volume of business on the flat rate basis. The graduated scale of rates thus made possible gives service suitable to any class and at a price at once attractive to both patron and stockholder."

Stromberg-Carlson has party line systems designed to meet the wants of all classes of subscribers. The American Electric Telephone Company offers the Leich system, which is a strictly selective and reliable system. The Swedish-American Telephone Company follows suit and exhibits in its trade publications a very admirable multistation circuit. Some of the towns where the Independent companies appreciate the value of party lines and either are installing or have recently installed such systems are Mansfield, O.; Massillon, O.; Trenton, N. J.; Terre Haute, Ind.; Reading, Pa.; Tampa, Fla.; Kewanee, Ill.; Youngstown, O.; Lima, O.; Fort Worth, Tex.; Jackson, Tenn.; Allentown, Pa.; Brazil, Ind., and Springfield, Mo.

So, from all aspects, the party line must be considered as an important adjunct in telephone service. But the party line is by no means a patent medicine which will cure all diseases, nor should it be prescribed in all cases. The proper method for the general manager of any telephone company is to make a careful examination of his subscribers, ascertaining what the amount and nature of their traffic is and what their circumstances are. When any new subscriber applies for service his probable business and circumstances should also be considered. With this information at hand the thoughtful manager can pick out these subscribers whose business can be best served by party lines, and to those he may confidently offer this form of service. If this is wisely done it will meet the hearty approval and commendation of all subscribers and will redound to the profit of the telephone company.

The argument for measured service seems to us to follow along the same lines. In the telephone as well as any other business it is right that the consumer should pay exactly for what he gets—no more no less.

THE TELEPHONES ON THE PRUSSIAN-HESSIAN STATE RAILWAYS.

THE block stations on the Prussian-Hessian State railways situated between two signalling stations are usually fitted with Morse apparatus, enabling the same to enter into communication between one another and with neighboring stations, whereas the remaining posts included do not as a rule, possess a similar means of communication. On lines with high

traffic it should, however, be very desirable that the single posts could communicate rapidly and safely both with neighboring stations and between one another, in order to prevent danger or to apply for help. The use of Morse apparatus for a similar purpose would not always be sufficient, as experiment has shown in the case of accidents or disturbances on the track that operators

of little practice in telegraphing having been called to the spot, often produce unreadable telegrams, and that even block guards in the excitement of the moment, are unable to telegraph rapidly and correctly. It is, therefore, advisable to fit every post with telephones, which are able to warrant comprehensible communication without requiring special knowledge or prolonged practice.

The requirements for these telephones are as follows:

1. Any telephone inserted between two stations on the track should be able to receive simultaneously the dispatch, on the principal alarm signal being given from any post. Any station and auxiliary station should be in a position to communicate with any one of the connected posts, even in the case of several unused track telephones being interposed, for which the local alarm signal is not intended. The transmission of sounds ensured by these telephones should be as strong and pure as possible, i. e., free from any disturbing secondary noises and as independent as possible of atmospheric influences. Finally, the telephones should be of an especially easy handling, and on account of their object and arrangement, should be of a strong construction and proof against bad weather.

These requirements are fulfilled by the track telephone recently

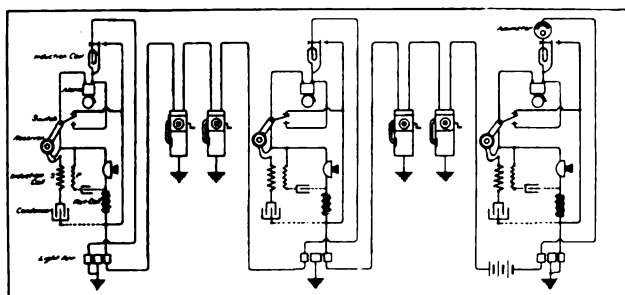


Fig. 2. Circuit of Railway Telephones.

adopted by the Prussian-Hessian State Railway, showing novel features as compared with present construction. These devices are protected by letters patent in favor of the Berlin Siemens & Halske Company. An illustration of the instrument is shown in Fig. 1.

By means of a novel arrangement, a combination of all the batteries necessary to work any telephones included in a section of track, is made possible at the initial or terminal station. The evident advantages of avoiding single microphone batteries with the telephones of intermediate stations, is of special importance as disturbances of the plant on account of insufficient maintenance or freezing of the cells will be avoided. The second novelty is the use of continuous current to indicate the satisfactory state of the line and apparatus. This continuous current is supplied from the battery at the main station, through the telephone included in the section of track in question, in addition to yielding the energy necessary to operate all the microphones, it enables all the necessary apparatus and lines to be tested by the insertion of an ammeter.

The telephone line is generally arranged from station to station, so that any two stations will form a closed telephone district with the intermediate telephone station. The line ends either in

the final signal box or in the office of the station. The maximum number of telephone stations combined in one telephone district does not, as a rule, exceed 8. In the case of more than 8 posts the line is generally separated at one of the intermediate posts, thus dividing the telephone line between the two stations into two districts. Great care has been exercised to secure a convenient arrangement and design, not likely to get out of order. By the use of a receiver without cords attached to the case in a solid and yet easily movable fashion, all drawbacks attendant on the use of cords are avoided. The receiver is attached by means of a coiled piece of tubing containing a leaf spring, to the terminal at the left side of the box, which can be turned downwards to normal position. When in use the telephone is lifted to the level of the

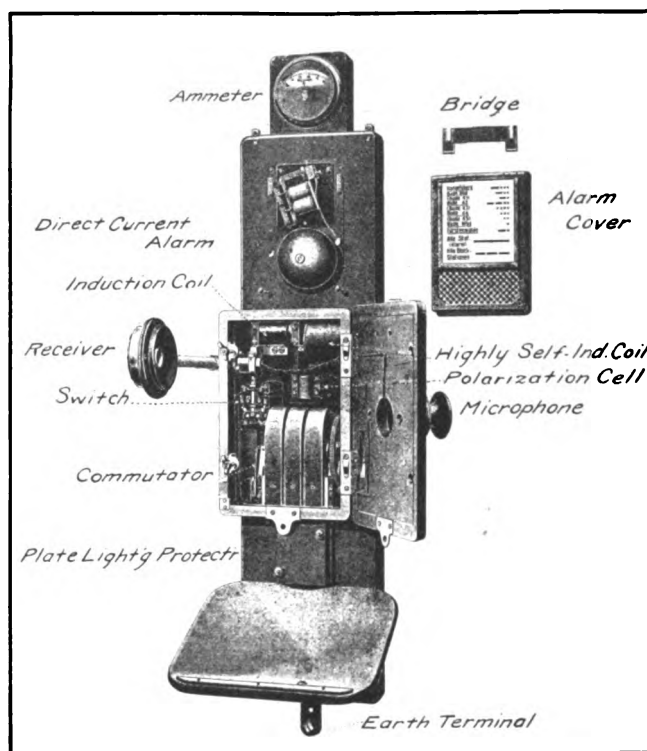


Fig. 1. Prussian Hessian Railway Telephone.

ear, the circuit being automatically switched in and the signal bell of the transmitting station disconnected. The lateral spring allows of the telephone being firmly applied to the ear without exertion, and the distance between the speaker's lips and the microphone is regulated. This is advantageous, as insuring a uniform transmission. After the conversation is finished, the telephone is automatically returned by its own weight, thus disconnecting the telephone circuit and again connecting in the signal bell. The drawback inherent in the usual cord telephones, which frequently would be left disconnected, are thus avoided. The switching device, worked automatically by the motion of the telephone, is very similar to a well-known type of alarm key. The circuit used is shown in Fig. 2.

THE CUYAHOGA'S ANNUAL SHOWING

PRESIDENT DICKSON ADVOCATES MEASURED SERVICE AND PARTY LINES

IN its offices in the Electric Building in Cleveland, the stockholders of the Cuyahoga Telephone Co. of that city recently held their yearly meeting, at which President Dickson presented his annual report. The report is of such interest to the Independent operator that we here reproduce it. The showing is remarkable considering that the conditions under which the company has been operating were not the most favorable. The switchboard now in use is of the divided multiple type and the incom-

venience attendant with the manipulation of the calling buttons was a serious handicap to the service that the company aimed to give. A new, most modern full supervisory lamp signal board is now being installed to replace the old one, so when it is ready for service, which it is expected will be about March 1st, the Cuyahoga will be in a position to compete in the matter of efficient service with any operating company in the country.

The stockholders indorsed President Dickson's successful profit

sharing scheme, whereby the employees of the company shared in its profits, so it will be continued through the present year on the same basis that was originally laid out.

There is now in the company's treasury \$837,950 of common stock of the six per cent. cumulative, which will take care of expenses incident to the installation of the new board and the campaign for business which will be inaugurated when the new apparatus has been installed. There is now a bonded debt of \$2,233,000 and current liabilities of \$171,338.14, and deferred liabilities of \$8,644.72. The Federal Telephone Company was owed at the beginning of the year something like \$500,000, but this has been paid by the issuing of preferred stock.

The board of directors was re-elected as follows: W. H. Lamprecht, H. A. Everett, R. A. Harman, B. Mahler, E. W. Moore, F. T. Pomeroy, F. M. Stearns, H. R. Newcomb, F. S. Dickson, J. W. Marsh, James R. Sprinkle.

Following is the financial statement for the two years past. It shows a net surplus for 1903 of \$46,616, as against \$542.07 for 1902, although in 1903 over \$4,000 was paid to employees as part of the profits and the dividends on the preferred stock have been charged out of the net earnings:

Earnings—	1903.	1902.
Rentals, telephone	\$322,806.92	\$313,857.21
Rentals, building	50,412.70	45,141.19
Tolls	20,149.98	20,813.19
Miscellaneous	3,120.60	6,040.55
Total earnings	\$396,490.20	\$385,852.14
Expenses—	1903.	1902.
Operating	\$49,402.33	\$59,052.47
Maintenance	102,734.82	114,689.45
General	45,281.75	36,546.83
Total	\$197,418.90	\$210,288.75
Percentage, expenses to earnings...	49.36	54.59
Taxes	\$19,041.62	\$19,420.84
Expenses and taxes	\$216,460.52	\$229,709.59
Net earnings	\$180,029.68	\$156,142.55
Deductions—	1903.	1902.
Interest on bonds	\$111,650.00	\$111,650.00
Miscellaneous charges	4,790.88	3,092.37
Reserve for bad debts and depreciation	9,517.95	40,858.11
Reserve preferred stock	1,800.00	
Fee Secretary of State.....	1,500.00	
Total deductions	\$129,258.83	\$155,600.48
Surplus for period	\$50,770.85	\$542.07
Employees' share of profits (for six months)	4,154.69	
Net surplus	\$46,616.16	\$542.07
Deficit, December 31, 1902.....	\$29,142.72	
Charges, earnings 1903	253.55	
Charges, expenses 1903	1,818.80	
Corrected deficit, December 31, 1902.	\$31,215.07	\$29,684.79
Surplus, December 31, 1903.....	\$15,401.09	\$29,142.72

Below is President Dickson's annual report. It describes fully the present condition of the Cuyahoga.

PROPERTY AND PLANT.

The cost of property and plant appeared on our books on December 31, 1902, was \$5,714,242.85, and this amount had been reduced to \$4,444,710.00 on December 31, 1903. This large reduction was brought about by the decrease in the common stock from \$3,000,000 to \$1,500,000 and the creation of \$1,500,000 of preferred stock, which you authorized during the past year. This enabled us to use a portion of this preferred stock to settle the debt of the Cuyahoga Telephone Company to the Federal Telephone Company.

During the year 1903 we expended \$32,783.09 in additions to our plant, but

as \$2,478.82 of this amount, though necessary to our development, did not directly produce additional revenue, this amount was charged to expense account as maintenance, and the balance, \$30,304.27, charged to construction. This expenditure produces an annual revenue of \$8,949.71, or very nearly 30 per cent of the investment.

On December 31, 1902, the total number of telephones in use was 10,168. During the year 1903 we took out 1,871 telephones, a large proportion being removed on account of non-payment of rentals. As we did not desire new business, pending the installation of our new equipment, we employed no canvassers during the past year, but notwithstanding this, the number of new telephones installed was 2,169, leaving a net gain of 298 telephones. The total number of telephones in use on December 31, 1903, was, therefore, 10,466. During the same period we put in fifteen new private branch exchanges and took out six, leaving a net gain of nine.

The collections for telephone rentals show a substantial increase. In 1901, the total collections amounted to \$220,277.99; in 1902 to \$296,425.20, and in 1903 to \$319,298.78. The increase in 1902 over 1901 was \$76,147.21, and 1903 shows an increase over the preceding year of \$22,873.58, while the increase in earnings was but \$8,949.71.

PROFIT SHARING.

In July last, in lieu of any increase in wages, we offered to put in operation a plan of sharing with our employees a portion of the profits made in our business. We did this, believing that the result would be an actual decrease in our expenses, coupled with an increase in efficiency. This plan has been widely commented upon by the press and warmly commended by many prominent men throughout the country.

We have been working under this system for six months now, and I believe the results achieved are sufficient to justify its continuance. From the report of the auditor we find that the surplus earned during last six months of 1903 was \$20,773.47. Our offer was to set aside 20 per cent. of this sum as the share of our employees in the profits earned. This share amounts to \$4,154.69, and is equal to about 6 per cent. of each employee's salary for the half year, or in other words, a little more than one-third of the monthly wages. I did hope that they would earn at least one-half a month's wages in this way, and I believe that by combined effort, the share of the employees can easily be increased to more than that proportion. We must have the cordial aid of our employees to give the best service and earn for you the highest profits, and I know of no better way of accomplishing this end than through the method we have adopted. I desire to continue our efforts along the same lines and would ask your cordial endorsement on this important matter. A resolution to this effect will be submitted for your consideration, and I urge that the views of the stockholders be clearly expressed.

SUBSCRIBERS ARE STOCKHOLDERS.

To achieve perfect success, which is at this time clearly within our grasp, will require, however, not only the concentrated efforts of our employees, but at the same time, we must have the active co-operation of our stockholders and of the owners of our bonds. We have at the present time 415 stockholders, and the value of the support which these stockholders can render to the company can scarcely be overestimated. This support we believe we have the right to expect. The Cuyahoga telephone is a local enterprise and nearly all of its stock and most of its bonds are owned by residents of this city.

Cleveland does not need the kind offices of a foreign corporation to supply its people with telephones, and such competition should not be tolerated any more than you would listen patiently to the urging of a Massachusetts company to permit them to supply you with water to drink, or gas to burn, or electricity to light your weary way to bed. Public service corporations should be owned by the people whose interests they attempt to serve, and the profits of the enterprise should be divided among those who make profits possible, and not go to swell the income of the residents of distant cities.

We not only desire to arouse the increased activity of our present stockholders, but we earnestly desire to increase the number of those interested financially in the success of this company. From the treasurer's report, you will note that we have in our treasury 16,759 shares of the 6 per cent. cumulative preferred stock of our company, which has a par value of \$50.00 per share. We would like to distribute a portion of this amount among the users of our telephones. Thus far we have paid no dividends upon this stock, though we have more than earned them. The money available, however, was needed for imperative development, and, therefore, the declaration of our dividends was postponed; being cumulative, however, the dividends will have to be paid some time, if the company earns them, and this it has demonstrated its power to do. We would, therefore, like to propose to our telephone users that we will sell this stock to them, giving them the privilege of setting off the quarterly dividends upon their stock against the rentals due for the use of the telephones. Thus, if a user owned twelve shares of this stock, it would represent a par value of \$600 and the dividends, payable quarterly, would amount to \$9.00. If, at the same time he had a telephone on a rental of \$36.00 per year, the dividends would pay the rentals.

NEW APPARATUS.

The new switchboard is being rapidly put in place, and we still expect to have it in running order by the first of March next. This new board is what is known as the common battery full multiple type, equipped with the latest and most approved devices. It will enable us to abandon the old button system, which has been so annoying to our patrons—the exchange being notified of the subscriber's desire to talk by simply removing the receiver. The ultimate capacity of the board will be 18,000 lines, or would supply that number of main line telephones. As we will, however, offer to the public two and

four party line service, with the latest improvements, we may possibly calculate that our average will be two telephones to each pair, and thus our ultimate switchboard capacity would enable us to take care of 36,000 subscribers. This switchboard is the largest in existence in any exchange but one—the new board lately erected in Buffalo being of the same capacity. Our sub-exchanges will add nearly five thousand telephones to our total.

NEW RATE SCHEDULE.

On the installation of the new board, we will be prepared to give the best possible service to our customers, and we will then adopt a new schedule of rates. New subscribers on business telephones may be required to pay a larger sum than they do now, but the charge will be justified on account of better service and a largely increased number of available connections. We are advised by the ablest legal authorities in Cleveland that we have the right to readjust our rates without asking the consent of the municipal authorities. When these rates were first made by ordinance, it was the intention to provide service to about 1,000 subscribers in the center of the city. With the development of the system we are now giving over 10,000 connections for the same rates as formerly. Of course it is not possible for us to do this profitably. As the number of telephones increase the expenses increase more rapidly than the revenue, and if the company is able to give a larger number of connections, it would be justified in charging an increased rate for the increased service.

If a company with 1,000 telephones charges \$48.00 a year for a business telephone, the user pays \$0.048 for each connection, but if the user is provided with ten times the number of possible connections at the same annual rate, he will pay one-tenth what he did for each connection. Obviously, in a city increasing as Cleveland is, the time will naturally come when any exist-

ing rates will become unprofitable. As service increases rates must increase, though by no means in as great a ratio. We will not, however, increase any rates until the increase in telephones clearly justifies our action, and even then, while some of our patrons will be asked to pay higher rates, our new system will enable us to give even lower rates to others.

MEASURED SERVICE AND PARTY LINES.

We will be prepared to give the first thoroughly satisfactory measured service known to telephony by means of a registering device which we have secured, invented by James Plew, of Chicago. By means of this attachment, the user registers the call himself, has the number of calls constantly before his eyes, and the home office can read the number at any time by making an electrical connection. We propose to give a four-party service limited to fifty calls a month at a monthly charge of \$1.75 with an additional charge of one cent for each extra call. We believe this rate will be popular with our customers and profitable to the company.

We have entered into a contract with the Standard Protective Company, who will use our wires to connect with business places and dwellings for the purpose of notifying the exchange of an attempted entry by burglars and the exchange will notify the police station nearest the scene of the crime. All expenses attending this system will be borne by the Standard Protective Company and the Cuyahoga Telephone Company will receive a percentage of the gross earnings as its share.

We desire to thank you for your cordial support in the past and will ask you for still more active support in the near future. We believe that it would only require united effort on the part of all those interested to make this company one of the most efficient in the country and a source of great profit to its owners. It only requires concentrated effort on the part of us all to make this a steady dividend payer within a year.

RESULTS OF THE KANSAS CONVENTION.

THE third annual convention, held at Topeka, January 28th and 29th, was a very marked success, even for Kansas.

The general interest in the affairs of the Association, on the part of the Kansas Independent operators, can be best understood when it is stated that out of a membership which includes fully 85 per cent. of the Independent properties of Kansas, only four companies were not represented at the convention. Two or three cases of differences between members were brought before the convention and amicably settled to the satisfaction of all parties concerned. The affairs of the Association are in a most harmonious and satisfactory condition, and the members without exception are enthusiastic in their support of the organization, and generally optimistic in their views of the Independent situation in this State. The recent opening of the magnificent exchange of the new Kansas City Home Telephone Company, in connection with the rapid construction of first-class long-distance toll lines between that city and Topeka, St. Joe, Atchison, etc.; the construction by the Union Telephone Company of their splendid trunk line between Topeka, Manhattan, Junction City, Abilene, Concordia, Beloit, etc., which will place all the central part of the State in easy reach of Topeka and Kansas City, together with the phenomenal success of the Independent plants at Topeka and Wichita and elsewhere throughout the State, are sufficient to warrant the general feeling of gratification.

Notwithstanding the strenuous efforts of the Bell people to form alliances with various Independent companies, the Independent line now presents a stronger front than it did one year ago. The Bell Company in Kansas is now so hopelessly beaten that it has very little of real value to offer an Independent company as an inducement to connect with it. The coming year will see the State well provided with Independent copper metallic long distance toll lines, and when that time arrives it is really a serious question what will happen to the Bell Company.

As has been noted in a number of the lay and electrical journals,

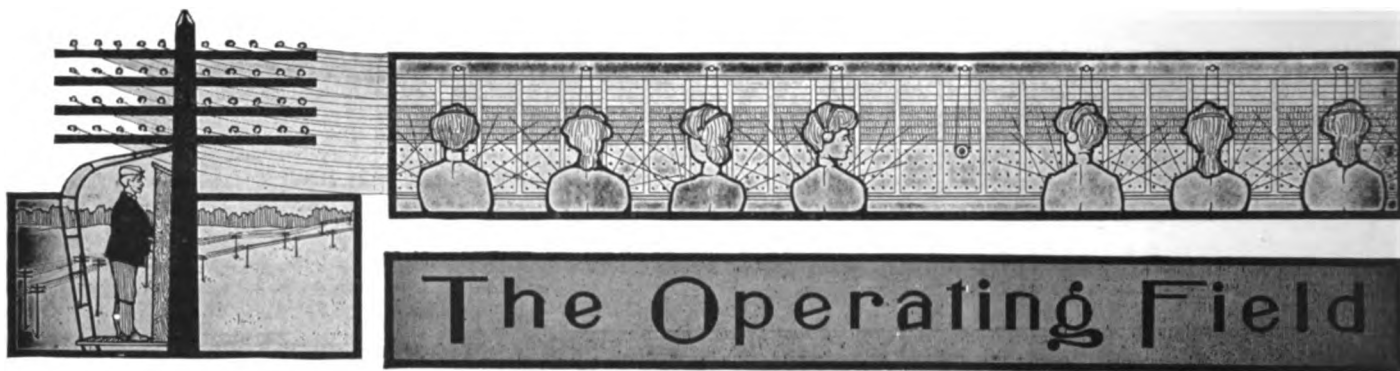
the Kansas Supreme Court in November last handed down a decision to the effect that the construction of a telephone line along the highway was an additional burden upon the fee of the land, and that the abutting property owner was entitled to compensation for such additional burden. Strange as it may seem, this case was the result of a fight between a farmers' telephone company and a farmer. The farmers' telephone company not being a member of the association, the matter got into the Supreme Court without the knowledge of the association. As soon as the decision of the Supreme Court was rendered, the officers of the association took the matter up, with a view of ascertaining whether the various features of the case had been properly covered in the previous briefs and arguments, and with a view of securing a rehearing in the case, should it be found advisable. While all the records in the case were not as clear as could be desired, yet it was felt that there were features not covered which would, if properly placed before the court, secure a rehearing.

That this belief is well founded is evidenced by the result. On January 20th the Supreme Court granted the petition for rehearing, and it is the firm belief of the association attorneys that the retrial of the case will result in a decision which will relieve the telephone interests of the State materially. It is in the handling of such matters as these that the value of organization becomes apparent. What one company, alone and unaided, could hardly hope to accomplish without an expenditure which would be a serious drain upon its resources, the State Association may undertake and provide ample funds and yet make the burden light for each member. The successful conduct of the case referred to, since the matter was taken up by the association, is due to the untiring efforts of President Godard and the eminent counsel associated with him. Mr. Godard, in addition to his large interests in the Topeka Independent Telephone Company, is a member of the well-known law firm of Valentine, Godard & Valentine, and is ex-Attorney General of the State of Kansas.

POLE TAX DEVOTED TO CARE OF POLES

IN order to impose a legal tax on telegraph and telephone poles in accordance with the recent decision of the Supreme Court of the United States, which holds that boroughs have no right to tax these poles for revenue, the town council of Norristown, Pa., has adapted itself to the occasion by passing an ordinance which devotes the entire receipts from the pole tax in the town to the care of the poles. The new ordinance provides for a

daily inspection of poles carrying electric wires and authorizes the appointment by the council of an inspector of poles, with deputies on each beat, and an inspector of wires, with salaries respectively of \$25, \$10 and \$20 a month. The inspector will be the chief of police, the deputies will be the members of the police force and the inspector of wires will be the borough electrician.



ORANGE AND SUSSEX MEETING.

THE annual meeting and election of officers of the Orange & Sussex Independent Telephone Association was held in Middletown, N. Y., recently.

The several independent telephone companies comprising the association were represented as follows:

Warwick Valley—George F. Ketchum, Hon. M. N. Kane, S. H. Sanford, George H. Strong, of Warwick.

Farmers: R. S. Coursen, J. I. Brink, of Coleville; F. E. Armstrong, C. J. Stanaback, of Sussex.

Highlands—George R. Conklin, of Monroe; M. C. Tuthill, of Washingtonville; Henry Greenfield, of Woodbury Falls.

Chester—Joseph Board, George M. Roe, of Chester.

Sussex—Dr. J. N. Miller, of Newton.

Colonial—George G. Otis, of Newburgh.

Orange County—A. B. Wilbur, Charles Higham, W. C. Ramsdell, Morris B. Wolf, John McWilliams, of Middletown.

The officers elected were:

President, George G. Otis, of Newburgh; vice-president, George F. Ketchum, of Warwick; Secretary, Mott C. Tuthill, of Washingtonville; treasurer, W. D. Haggerty, of Sussex.

BELL MUST RENDER AN ACCOUNTING.

JUDGE COLT, in United States Circuit Court, has ordered that American Bell Telephone Company render accounting to Western Union Telegraph Company, the cause being referred to Everett W. Burdett as special master, before whom all evidence, deeds, books, papers and writings are to be produced. This decree is a sequence of the action of the United States Court of Appeals, reversing the decision of the United States Circuit Court, which confirmed the master's report that the Western Union could not recover in its suit seeking an accounting for certain shares of stock in the companies licensed by the Bell Telephone Company, under a contract made in November, 1879.

A TOLL ASSOCIATION IN THE SOUTH.

AT a meeting held recently in the offices of the National Telephone Company, at Wheeling, W. Va., J. Walter Barnes was elected president of a new Independent organization which was perfected on that day. Representatives from twenty-five independent lines covering Northern West Virginia, Eastern Ohio and Southern Pennsylvania met and perfected an organization, which will be known as the Tri-State Toll Association. The following were elected officers of this new organization: President, J. Walter Barnes; vice-president, Mr. Doudna; secretary and treasurer, W. C. Handlau. An executive committee of six was appointed for the purpose of preparing by-laws for this new organization, and suggesting topics for discussion as they may deem pertinent for the good of the organization.

The Tri-State Toll Association will meet twice a year in Wheeling, which meetings will be held in the month of January and July. The purpose of this combination is to make arrangements one line with the other to connect all lines and thereby give to the subscribers of the respective lines the advantages of the long distance service, and to establish new stations where the general public can get long distance connections to any part of the territory

which they control. The association will meet in February again, at which meeting the organization will be permanently affected and unfinished business of this meeting will be completed.

The National Telephone Company, the Consolidated, Beeghly, Buckhannon, Burton & Mannington, Exchange, Cameron, Harrison County, Belmont, South Pennsylvania, Pine Grove, Union and Flushing Telephone Companies, operating all over West Virginia, in Western Maryland, Western Pennsylvania and Eastern Ohio, were some of those represented.

MR. TËTU ASSISTS AT KANSAS CITY.

THE directors of the Kansas City Home Telephone Company borrowed Mr. A. L. Tëtu, who is manager of the Louisville Home Telephone Co.'s Exchange, to assist them in the opening of their plant. Mr. Tëtu was in Kansas City almost a month, helping the new company over the roughest period of its existence, its opening. Mr. Tëtu has already quite a reputation as an exchange manager, and his assistance in starting the Kansas City installation was most efficient. Everything is now running even more smoothly than could be expected.

MUST PAY FOR CARRYING WIRES ON BROOKLYN BRIDGE.

SOME traction interests have been making the point that they alone are burdened with the taxation of the privilege to cross the Brooklyn Bridge. It has been learned, however, from the commissioner of bridges of New York City that every telephone and telegraph wire which crosses the structure must pay toll. The taxation amounts to \$30 per wire per annum. In the case of the cables the charge is \$250 per cable per annum. At present there are two ocean cables crossing the bridge. The total receipts from the telephone and telegraph companies alone by the bridge department have been as high as \$40,000 per annum, but during the past year these receipts have been diminished by the withdrawal of most of the wires of the New York Telephone Co., which has found a way of running its circuits along the bed of the river. On account of these withdrawals the receipts from the telegraph and telephone companies have fallen to about \$10,000 per annum.

TELEPHONE COMPETITION PAYS.

THE following from Grand Rapids, Mich., was received by a gentleman in Evanston, Ill., in reply to an inquiry addressed to the mayor of that city:

CITY OF GRAND RAPIDS,
W. MILLARD PALMER, Mayor.

DEAR SIR: Replying to yours of the 18th inst., addressed to his honor, Mayor Palmer, and by him referred to the undersigned for reply.

I beg to inform you that we have two telephone systems in operation in this city: the Michigan Telephone Company (Bell), and the Citizens' Telephone Company.

Beyond a doubt the existence of two companies has promoted the use of the telephone. The Citizens' Company started giving service June 1, 1896, with 400 subscribers; their increase has been

as follows: Jan. 1, 1897, 1,776; Jan. 1, 1898, 2,100; Jan. 1, 1899, 2,525; Jan. 1, 1900, 3,119; Jan. 1, 1901, 3,435; Jan. 1, 1902, 3,794; Jan. 1, 1903, 4,927; Dec. 1, 1903, 5,183. At the time the Citizens' Company started the "Bell" company had 1,400 subscribers; they now have about 2,600, I am informed. The "Bell" rates at that time were \$48 a year for residence anywhere inside of the city limits, and \$50 for business within one-half mile of the office, and an increase in rates according to mileage. The "Bell" company rates to-day are \$18 a year for residence, and \$30 for business, for ground-line service, and \$36 a year for residence and \$48 for business for long distance metallic circuit service. The rates of the Citizens' Company have been kept at the same figure, or about the same, \$24 for residence, \$48 for business.

Very truly yours, W. J. LANDMAN,
Secretary to the Mayor.

THE FORT WORTH COMPANY KEPT BUSY.

THE new telephone company of Fort Worth, Texas, is moving at a lively gait. More than one thousand telephones have been installed and orders from new subscribers are pouring in daily. The company is expending all its efforts toward perfecting the local exchange. When this is a little further advanced the long distance service will be pushed energetically. Mr. James Keenan, the general manager, said recently: "Our local exchange here must necessarily be developed first, as small towns were built before larger ones. Telephone companies must have long distance connections, as it is absolutely necessary for their patrons, as well as for the existence of their exchange systems. I am confident that within the next three months we shall have 200 miles of long distance lines radiating from our Fort Worth exchange. We are already extending our local plant to North Fort Worth, Glenwood and Polytechnic Heights."

THE SWEDE WHO WANTED A TELEPHONE, BUT—

THE York County Telephone Company, of York, Nebraska, in soliciting for new patrons, recently came across a Swedish-American citizen, who said he wanted a telephone. He put the solicitor off, however, from day to day, always saying to call around to-morrow.

The company finally wrote him a personal appeal in an endeavor to clinch the business. Here is his reply *verbatim*.

"Mr. I gass I cante tage no Telephone mi wouman se don't want no 'phone in our house i may tage one later on if i cin gite it tauct in to hur se is fating hard aginst it befor i haf afouse wit hur altime i bater tag none four a wile.

"Your truley."

If all female minds were as determined as this Swede's wife's, the telephone business would undoubtedly suffer stagnation. Let us all give thanks that the majority of the beautiful creatures are prone to talking, and quick to take up any new method thereof.

ANNUAL CONVENTION OF THE IOWA TELEPHONE ASSOCIATION.

THREE HUNDRED representatives of the Independent telephone companies of Iowa, will assemble in Des Moines, March 8 and 9, for their annual convention. A meeting of the executive committee for the purpose of selecting a place of meeting and to make preparations for the reception of the delegates will be held in Des Moines in the near future. The members of this committee are Dr. Herr, of Ottumwa; W. S. Alderman, of Nevada; J. S. Bellamy, of Knoxville, and J. M. Bandy, of Des Moines, Iowa. Secretary C. C. Deering is now engaged in preparing a program for the meeting.

CAN YOU BELIEVE THIS?

BECAUSE there are people in the country who have never seen a telephone and know nothing of its perplexities and mysteries, a lineman is suffering from a gunshot wound. A few days ago the lineman was sent down into the hills of Kentucky to locate a break in the wires of his company. The line he was sent to look after runs direct from Georgetown, Ky., to Huntington, W. Va.

On account of the topography of the country the line, which goes as a bird would fly, crosses some of the wildest parts of the "dark and bloody ground." Our lineman climbed a pole near Mt. Olive, Ky. He had a telephone test set with him, such as linemen carry, and wanted to talk to the superintendent of the company in Cincinnati. When he reached the top one of the natives came running out with a rifle in his hands and wanted to know what he was doing up the pole with such a queer looking instrument. The native was told he was a workman and that he was talking to Cincinnati.

"Come down out of that," was the injunction he received. "No honey cooler can come around here and tell we'uns such trash as that. Come down, I say."

The lineman paid no attention to the command and was shot in the leg, which caused him to fall a distance of about twenty feet. The mountaineer took him into his home and dressed the wound, and then sent him away with the explanation that a man had paid him \$5 for the privilege of putting the post in his front yard, and he did not intend to let anybody climb it but the man who paid the money.

LONG DISTANCE MACHINERY REPAIRING.

A LONG distance telephone between Boston and Mexico has been put to use, which illustrates its value in a novel and forceful manner. A machine to put eyelets into shoes was sent from Boston to Mexico, but the persons who set it up did not succeed in making it work to their satisfaction. After some correspondence the long distance telephone was brought into use, a number of experts placed themselves in the Boston office and the operating room in Mexico was also connected with the telephone. The machine in Mexico was then set to work, and the experts in Boston listened. They soon discovered from the sound where the trouble was, and it was remedied by the operators in Mexico. Almost every machine has a language of its own, and persons who are familiar with it can diagnose ailments when the contrivance is out of order by listening to it.

INVENTS A SIGNAL SYSTEM.

WINFIELD SCOTT, a farmer, of Anderson, Ind., president of a rural telephone company, has devised a signal for all patrons of his system in case that some one on the line is in distress or in need of help. Six long rings, followed by a short pause, and then six short rings, will mean to attract all parties on the circuit. Following the general alarm signal, the operator at the central station will then give the number of rings indicating the party at whose home there is need of assistance by neighbors. President Scott says that in case of fire, or a serious accident, or a person injured, a robbery, or something alarming, all persons on the circuit can be advised, and it is asked of all subscribers on the lines to respond to the alarm signals as quickly as possible.

THE TELEPHONE CAUGHT THE THIEVES.

THE value of telephones in country districts was never better illustrated than by a recent incident in Northern Iowa. By means of first-class rural telephone communication a party of thieves was quickly run to cover and a large sum of money recovered. The thieves blew open the safe in a bank at Quimby and stole \$3,000. The sheriff, instead of at once starting in hot pursuit, called up every farmer in the district, with the result that the robbers were soon surrounded and captured. The network of lines which traverse the west is rapidly being duplicated in Western Pennsylvania.

SWITCHING CHARGE INFORMATION.

F. S. LAMBERSON, of Union City, Ind., gives us this information concerning switching charges: There is a Farmers' Mutual Company about seven miles from Union City, and that has a toll line which connects with the local exchange. The Union City subscribers get free service over The Mutual Company's line, and The Mutual Company's telephone holders have free service to Union City subscribers. The Union City Company gets 50 cents per telephone per month.



THE NATURAL MONOPOLY BOGY.

TELEPHONE COMPETITION IS RIGHT.

ONE does not hear so much these days of the old argument that the telephone business is a natural monopoly in which the ordinary laws of competition are suspended. It used to be the favorite cry of the Bell people, who, enjoying a very lucrative monopoly of their own, naturally desired to retain their hold upon the public. To-day Independent telephones actually outnumber the Bell, and Independent operators have very successfully invaded the Bell fields of operation. They have asked for and obtained the recognition and patronage of the public, not by such a specious argument but on business principles based on service. Yet even now this argument is sometimes heard.

It is a plausible argument on its face, and when competition threatens to invade some pet Bell territory can be used very effectively. Bell agents point out to the business man what a nuisance two telephones would become. "From the very nature of things," they say, "the entire telephone business of the community should be conducted from one central point and all the people served by a single system." In some places the Bell agents have actually made the public believe, for the time being, that a competing telephone system would be an unmitigated nuisance, and in consequence some difficulty has been experienced in securing franchises.

THE AMERICAN TELEPHONE JOURNAL knows of many such instances. A case in point is a Western city of about fifty thousand inhabitants, the commercial center of a large district. Instigated by the misrepresentations of the Bell people the business men's association of the city held a meeting and solemnly voted its disapproval of competition in telephone service. The Independent company already had its franchise and proceeded to put in a first-class up-to-date telephone system. When the time came to install instruments no especial effort was made to secure the patronage of the business men, but when in the course of a few months one thousand residences were using the new telephones, the business men fell over each other in their eagerness to secure the service, and they are now among the most enthusiastic supporters of the Independent system. Competition has had the usual and inevitable result. The number of telephones in the city has been doubled, the service greatly improved and the charges decreased.

Such experiences have become so numerous that the argument has lost much of its old time force. Misrepresentations of various kinds, the stultification of a postmaster-general, the subsidization of the press and all sorts of threats and intimidations have proved unavailing to even check the great revolt from Bell tyranny, which has been taking place during the past ten years. The Independents have gone quietly forward, asking for business on the basis of superior service, and the public has not been slow to respond.

The truth is that in telephony, as in every other line of business, honest competition is wholesome. Its stimulating influence is needed to maintain the service at the highest possible standard and to keep the price of this service within reasonable bounds. In this connection it is interesting to compare the records which show the telephone output from year to year, and consider the significance of the figures.

Take for instance the year 1894. The records show that at

that time the telephone business throughout the United States was almost stationary. The reports of the American Telephone and Telegraph Company show an increase in its output during that year of only 2.8 per cent., or 8,000 telephones.

The telephone was seventeen years old at that time, but there was not any competition. The great Independent movement had not really started. Here and there an effort was being made to throw off the yoke of this, one of the most grasping and unrighteous monopolies that ever infested a people, but Independent telephony had not really obtained a foothold. The Bell people had everything their own way.

Then the Independent movement began its resistless sweep across the country and under the stimulus of competition the output of the Bell company increased from year to year until it reached its high-water mark in 1899. Then the effects of the superior management and more modern equipment of the Independents began to be manifest. The output of Bell instruments began to fall off in per cent., and during the past four years there has been a steady decrease each year and a corresponding increase on the part of the Independents. The growth of the Independent business has been phenomenal. After seventeen years without competition the Bell monopoly had only 291,253 telephones. In 1903 alone a single Independent manufacturer turned out over 150,000 telephones and the aggregate was something enormous. That tells the story.

The public is decidedly the gainer. From the point of view of the Bell company, however, there has been too much of a good thing. The aggressive and business-like competition of the Independent companies is gradually putting many of the Bell creatures out of business. The sale of the Michigan Bell company under the hammer and the present weak condition of the Central Union Company, notwithstanding that its stock has been cut in two, are evidences that too much competition, while a good thing for the public, is decidedly bad for a conscienceless monopoly.

The Independent operators have only just learned their power and begun to realize what can be accomplished by working together along harmonious lines. Heretofore this competition has been more or less disorganized. Henceforth they will pull together, independent as to their several territories but with a well-defined policy, making common cause against their common foe, the Bell interests.

One of the first steps that ought to be taken along the whole line is to force the Kellogg Switchboard & Supply Company to either do business as a Bell concern or to get out of the field. There must be no compromise in this matter. The company has gone over into the Bell camp and there can be no good reason why Independents should contribute to its support and thus give aid and encouragement to the enemy.

It is recorded that in the old days Cato closed every oration in the Roman Senate, whatever the subject, with the memorable words, "*Carthago delenda est*," Carthage must be destroyed. THE AMERICAN TELEPHONE JOURNAL feels so deeply in this matter, and sees so clearly the right course to pursue, it seems proper to close every article with a word of warning as to the danger in helping to swell the coffers of a persistent and unscrupulous enemy.

THE TELEPHONE IN THE COURTS

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

FRANCHISE OR LICENSE.

WE have a grant from the city to use the streets for the purpose of erecting our telephone poles. In reliance upon it, we occupied the streets as the ordinance provided. The ordinance included our "successors and assigns." Can we assign it to a prospective purchaser? Now it is said that the grant is merely a license and not a franchise and can be revoked by the city at any time and that we cannot sell it. T. F. CO.

A FRANCHISE is a special privilege conferred by government upon an individual, which does not belong to citizens generally, of common right. A license is permission to do an act or a series of acts. A license is personal, and as a rule cannot be assigned. It may be revoked at any time by the licensor. Am. & Eng. Ency. of Law.

However, in the case you state if the license was acted upon and accepted, it becomes a binding contract between the city and the company and cannot be revoked or rescinded except for cause. The clause granting permission to your company, "its successors and assigns," makes it clearly assignable in spite of the general rule to the contrary. In fact, your privilege partakes more of the nature of a franchise than of a mere license. See *People vs. Central Union Teleph. Co.*, 61 N. E. 428.

GOOD REASON FOR RAISING RATES.

THE Toledo Home Telephone Company of Ohio has filed its answer before the Supreme Court in the suit instituted against it by the city, looking to a restoration of its rates for business and residence telephones to the amounts specified in the franchise granted it by the probate court.

The answer recites at length that the telephone business is entirely different from any other, in that the more business it does the more proportional cost amounts to. At the time the franchise was obtained from the probate court, the Home Company believed that an exchange of 3,000 telephone capacity would be sufficient to accommodate all the subscribers it could secure, and that the application for the franchise, together with the rates specified therein were based upon that assumption. Acting upon that theory, it consented to fix the rates at not to exceed \$44 for business telephones per year and \$26 for residences. It continues that after the plant had been installed the number of subscribers became very much more than 3,000, and at the present time amount to more than 7,000, and that the company has now been forced to install a switchboard and other apparatus capable of caring for a service of 12,000 telephones. The answer then continues:

"Its patrons are, almost without exception, satisfied with the increased rate it is now charging on all new contracts, and that defendant is now receiving, without solicitation on its part, new applications at the rate of more than one hundred per month at the new rates, and that it is unable at the present time to provide and install telephones as fast as the applications are received.

"That it will be unable, if it cannot receive rates in excess of those specified in the order of the probate court, to further extend its exchange and plant to accommodate the additional subscribers who are requesting defendant to install telephones, and will be unable to give its subscribers first-class and modern service and equipment such as it desires its patrons to have."

It is then alleged that the Bell Company is unrestricted as to rates, and charges double the rates charged by defendant. It states that defendant permits connection with Independent telephone exchanges in other cities, and that therefore the bulk of the compensation for this business goes to the Independent long distance lines and does not leave the Home Company a fair return.

In conclusion, the answer alleges that the probate court and the

city of Toledo had no right to fix the rates which the defendant might charge its patrons, and that to enforce said rates would deprive defendant of its corporate rights and powers without any consideration therefor, and would cripple defendant in the exercise of its corporate powers and performing its duties to its patrons and the public.

TRIMMING TREES HELD LAWFUL.

THE following inquiry comes from one of the Southern States: For several years our telephone poles have stood in the street without objection from anybody. The common council passed an ordinance directing us to move our poles and place them inside the curb on the sidewalk. To do this it was necessary for us to trim trees belonging to an adjacent lot owner. Now he sues us for trespassing on his trees. Can you refer us to any cases that will help us? L. C. C.

IT is held by some of the Southern courts that where an act of trimming trees is done under lawful authority, such authority will protect the company from being treated as a trespasser, and its works from being declared a nuisance, if its works are so constructed as not to interfere with the property owner's right of ingress and egress to and from his property. If these decisions are followed in your State you will be without liability for your acts. *Southern Bell Teleph. and Tel. Co. vs. Constantine*, 69 Fed. 61.

A RELATION IN THE NATURE OF A TRUST.

THE case of *Western Union Telegraph Company vs. American Bell Telephone Company* has been referred to before in this department, but the rulings of the court have not been mentioned. It will be remembered that a contract was entered into by complainant and defendant, both being corporations owning patents over which litigation was pending between them and engaged in operating telephone lines and leasing them to others. By the contract complainant conveyed to defendant all its business and its patents and rights thereunder. The court held that the contract established between the parties a relation in the nature of a trust which required the telephone company to account and pay according to the principles of equity and gave a court of equity jurisdiction.

The consideration for the agreement was the promise of defendant to pay complainant upon all telephones used in the United States under any license granted by it "a royalty or bonus of twenty per cent. of all rentals or royalties actually received or rated as paid in accordance with the provisions of the contract from licenses or leases for speaking telephones." It further provided that certain stated rates were "recognized as the present standard rates of gross royalties or rentals," and that such rates might be increased by defendant at pleasure, but should not be lowered without complainant's consent, any increased rate, while in force, to be taken as the gross rentals or royalties in respect of telephones for which they were obtained. The court held that under the circumstances the phrase "rentals or royalties actually received or rates as paid" covered gross sums received by defendant for perpetual or other exclusive licenses under patents embraced in the contract for which sums such licenses were the only consideration. The court did not consider the transfer of stock to complainant as part of the consideration.

The court also considered and applied the rules with reference to the effect to be given to prior negotiations and other extrinsic circumstances in construing complicated contracts of many years' standing.

Western Union Tel. Co. vs. American Bell Teleph. Co., 125

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.

LAMP SIGNAL SYSTEM—(282).

Will you please give me a diagram of the wiring of a local battery, central energy telephone, also the drop and jack arrangement in the switchboard?
F. O. O.

We understand your query to mean a circuit which would be applicable to a telephone exchange operating by automatic signalling or a centralized battery while the sub-stations are

is precisely the same as in Fig. 282a. There is, however, no cut-off relay. In the place thereof a cut-off jack is used, namely: A jack which contains two interior contacts to which the battery line relay and signal are wired. When the plug is inserted in the jack the inner contacts are opened and the line signal extinguished. In this case a 2-wire cord and plug are sufficient and the test is obtained in the customary manner always used in magneto switchboards.

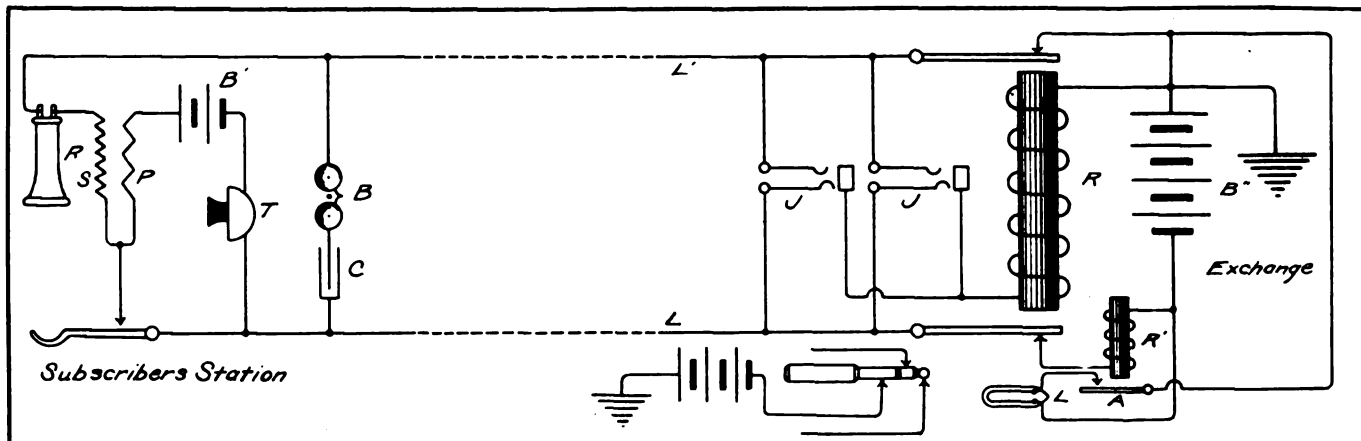


Figure 282a.

supplied with talking current from a local battery. This is known as the local battery automatic signal system. Many circuits have been proposed for this purpose, those which we show in Figs. 282a and b being common arrangements, but by no means the only ones. In Fig. 282a the subscriber's station is shown at the left hand, consisting of a receiver *R*, an induction coil *SP*, battery *B'*, and transmitter *T*. The hook switch is arranged to close the local and the battery circuit in the ordinary manner. Across the line the bell *B* is bridged in series with the condenser *C*. At the office the jacks *JJ* are arranged, one of which is an answering jack, while the others are multiple jacks. A line

A NOISY COMMON RETURN—(283).

A switchboard of two hundred line capacity with magneto metallic series drops wound to 350 ohms, with 12 sets of cords and cams with the first eleven pairs with condensers and the twelfth pair with a repeating coil, was found on being set up (on a common return system metallic to outside cable box and then one side of the cable pairs put to the return and the other to subscribers' line) only about one-half of the subscribers could talk through the board except on the cords with the repeating coil. They could converse with the central operator, but the minute the connection was put up the calling subscriber or the subscriber wanted could not be heard or hear each other. But on the cords with the repeating coils they could converse perfectly. Would not a ground on the return wire cause this trouble? About half the subscribers could talk through perfectly on any pair of cords.

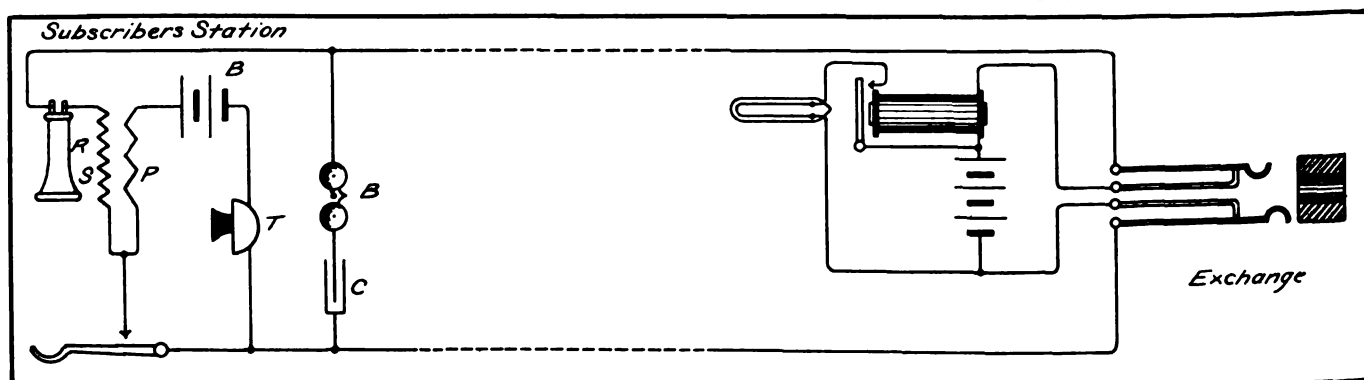


Figure 282b.

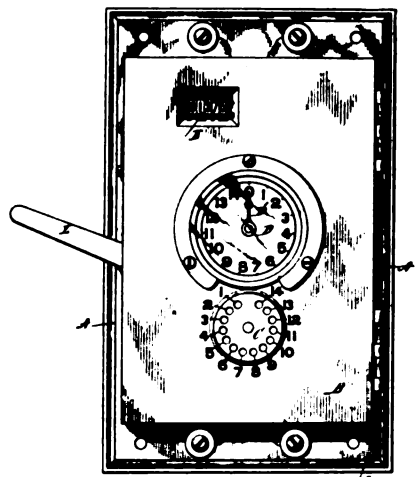
relay *R'* is arranged so that when the subscriber removes the receiver from the hook, the armature *A*, will be closed by a flow of current over the *L* side of the line through the *L'* side to the battery. The restoration of the relay *R'* causes its armature *A*, to close the circuit of the lamp *L*, which forms the line signal. When the operator inserts the plug in the jack *J*, the cut-off relay *R*, is operated and this extinguishes the lamp. The cord circuit of such an exchange resembles the regular cord circuit of a magneto board, excepting that a 3-wire plug and cord are used and battery is placed upon the sleeve terminal of the plug. This operates the cut-off relay and puts test battery upon the line. Another form of circuit is shown in Fig. 282b. Here the substitution

Sometimes putting an intentional ground at the office on the common return, or at other points on it will improve the service and sometimes it will not, and it is only possible to determine the best remedy by a careful study of local conditions. Inasmuch as it is very easy to try this experiment you could satisfy yourself as to whether it would or would not be advantageous. As, according to your letter, subscribers can talk satisfactorily over the cord having a repeating coil, it would appear that the introduction of a coil in the others would be a very cheap and satisfactory solution of the trouble. It is impossible to say whether a ground on the common return wire would or would not cause the trouble of which you speak, as this would depend on many conditions.

PATENTS ISSUED

IMPROVED PARTY LINE SYSTEM.

Uriah S. Jackson, of Ossipee, N. H., is granted two patents (Nos. 750,769 and 750,770) for an improved party line system, and assigns to the Superior Automatic Telephone Company Boston, Mass. The object of these inventions is to provide a party line system of the inter-communicating type, which shall be selective



and secret. The first patent covers the selective features and the second the secret features, illustrated in Figs. 1, 3, 4, 6 of patent No. 750,769 and Figs. 2, 6 of No. 750,770. Fig. 1 shows the elevation of the sub-station which contains the dial D, and the

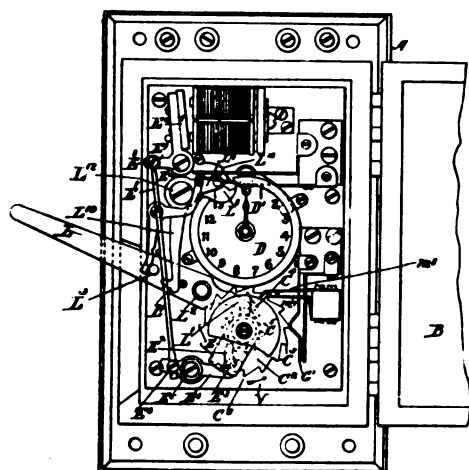
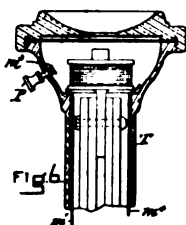
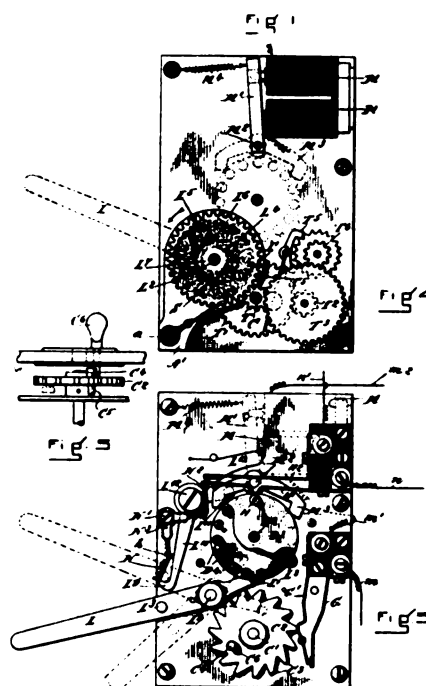


Fig. 2.



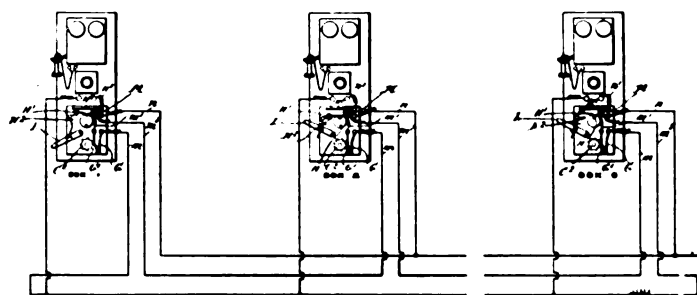
revolving disk C. The dial and the disk are numbered correspondingly with as many stations as are installed. Figs. 3 and 4 showing the mechanism. The handle L, is connected to the gear wheel L6, which contains a spring. Pulling the handle causes the wheel to rotate. This wheel is attached to the dial C,

which has a series of holes in it and is connected by a train of clock work to the indicator. By putting a pin in any one of the holes the disk is caused to stop at the number indicated. Every time that the indicator moves one notch, it opens and closes the



springs G G, and sends an impulse from the battery included in the circuit of Fig. 6, through the magnet M, in Fig. 4. Hence, every impulse moves the disk C on number A. A series of contacts is provided corresponding to the holes in the disk C. The talking circuit of every station passes through the different contacts hence any station may be selected by putting a pin in the proper hole pulling down the lever L, and releasing it.

Fig 2 of patent No. 750,770, shows the method of securing secrecy. The magnet L' controls the lever L10, and E7, by

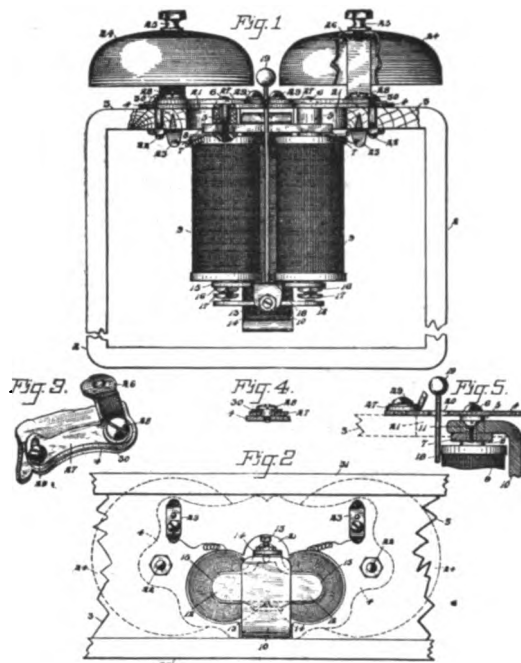


exciting this magnet. The dial D, and the disk C, can be locked and prevented from turning. In Fig. 6, the telephone receiver is shown. This is provided with a push button P, which controls the circuit of the magnet end, therefore, as soon as one station has called any other one, this button locks all the rest of the stations and prevents the use of any one so long as the push button is pressed.

IMPROVED MAGNETO BELL.

A. M. Knudsen, Chicago, Ill., patents (No. 750,288) and assigns to the Kellogg Switchboard & Supply Company an improved magneto bell. The object of this invention is to provide a ringer

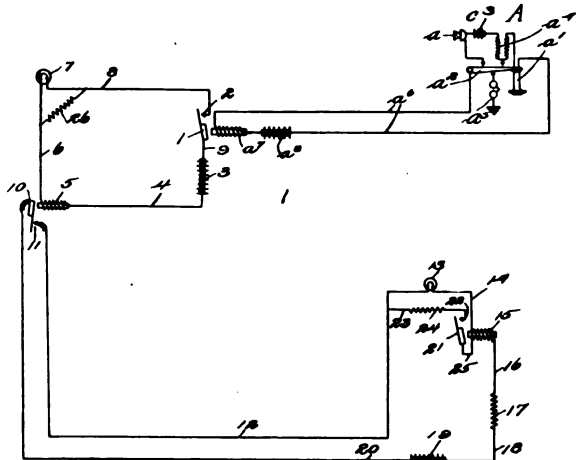
which is entirely self-contained, and means whereby it may be mounted and supported upon a box or other attachment without the necessity of taking the ringer apart. This invention is illustrated in the figures. There is a plate, *a4*, upon the underside of which there are the spacing-studs, *5*. A soft iron plate, *7*, is carried on the lower end of these studs, to the lower side of which the cores, *8*, of the magnet-coils, *9*, are fixed by means of the screws *6*, which pass through the plate, the spacing-studs and



the end of plate *7*. By this means all parts are secured together and fastened to the underside of the plate, *4*. A permanent magnet, *10*, is attached by its upper end to the center of plate *7* by means of the counter screw *11* (Fig. 5). This magnet operates to polarize the armature. The armature, *12*, is pivoted centrally upon pivots *13*, carried by lugs *14*, the armature support being secured at the lower ends of the cores, *8*, by means of jam-nuts, *16*, and thereby the armature is made adjustable. In other respects this ringer differs little from those in general use.

IMPROVED PILOT SIGNAL.

H. B. Clausen, Chicago, Ill., patents (No. 749,982) and assigns to the American Electric Telephone Company an improved

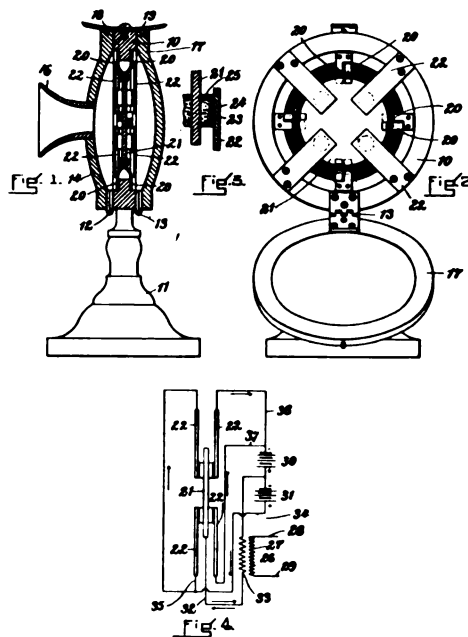


method of operating pilot signals. The object of this invention is to provide a signal which shall be instantly displayed and shall not fail to indicate even if a subscriber operates the switchhook with abnormal rapidity. It is shown in the figure. *A* is the sub-station equipped in the ordinary manner and extended to the central office by means of the lines *a6*. At the office there is a relay *a7*, that, when excited, attracts the armature *9*, closing the circuit *4*, *6* *8* and illuminating the lamp *7*, which is the

ordinary calling signal. At *5* there is another relay whose armature *10* closes contact *11* that extends, by means of the circuit *12*, *20* to the chief operator's desk. When the contact *11* is closed the lamp *13* is lighted but if the circuit is opened and closed rapidly the lamp might not have sufficient time to glow. The battery *19* is made of considerably greater voltage than is necessary to illuminate the lamp, and thus can light it very quickly, while to prevent the lamp from being burned out the relay *15* is provided so as to be slightly sluggish in action, but as soon as it is excited and the armature *12* closed, the shunt *24* is placed around the lamp *13*, which is thereby protected.

IMPROVED TELEPHONE TRANSMITTER.

Philip Randall, of Boston, Mass., patents (No. 749,448) an improved telephone transmitter. This device is shown in Figs. 1, 2 and 4. The inventor provides a base, *11*, upon which a sound-



receiving case, *14*, is arranged which encloses a pair of diaphragms *21*. Upon these diaphragms a number of carbon receptacles, *25*, are placed which are secured by the springs *22*. As many carbon receptacles can be inserted as may be desired, though the illustration shows four. Each carbon receptacle is pressed against the diaphragm by means of the springs *22*. The circuit of this transmitter is shown in Fig. 4, from which it is obvious that as the diaphragm *21* swings to and fro under the impulses of the sound waves received by the mouth piece, *16*, it alternately compresses and releases the carbon granules, *24*. Thus this invention belongs to the class of transmitters having several active electrodes.

AN ENTERPRISING ILLINOIS MUTUAL COMPANY.

THE Lawrence County Mutual Telephone System, of Lawrenceville, Ill., was primarily put into concrete existence on the first day of January, 1903, when it was planned to build a short line for mutual benefit. The line is twelve miles long and in three sections, having a switchboard at Pinkstaff, Ill. From this small beginning the exchange has grown and is now equipped with twenty-five drops and has one hundred telephone subscribers. Later, another switchboard was installed at the village of Birds, Ill., which is equipped with twenty drops and serves one hundred and twenty telephone holders. These two exchanges are connected with trunk lines and two others have been established in the county, each serving a larger number of shareholders than the ones mentioned above. One of these, the last mentioned switchboard, is at the county seat. The number of the Mutual telephones in the county now aggregates about five hundred, while the competition, The Bell Company, has only about seventy-five. All construction material and switchboard apparatus used are of the very best, and all exchanges are connected by through trunk lines. Adjoining counties have been working on the same plan.



FINANCIAL.

KENNEY, ILL.—The Kenney, Chestnut & Farmers' Mutual Telephone Company has filed a certificate increasing its capital stock from \$1,400 to \$4,900.

DETROIT, MICH.—The Co-operative Telephone Company has filed a trust mortgage to the Detroit Trust Company to secure a \$40,000 of gold bonds. The par value of the bonds at \$1,000 with 5 per cent. interest. The money is to be used for the extension of the plant.

BARABOO, WIS.—The Baraboo Telephone Company by Charles Gorst, president, and August P. Fisher, secretary, has filed amended articles increasing its capital stock from \$30,000 to \$50,000.

FRANCHISES

CENTERVILLE, IA.—At the regular State election to be held March 28 the citizens of Centerville will vote upon granting a franchise to the Exline Mutual Telephone Company for running country lines into Centerville to connect with the local switchboard.

COVINGTON, KY.—Sealed bids will be received at the office of the city clerk up to February 15th for franchises for establishing a telephone system in this city.

CINCINNATI, OHIO.—The city council has refused to grant franchises to the Queen City, Cincinnati, Interstate and Fitzsimmons Independent Telephone Companies. The companies may now make application to the Probate Court and franchises may be secured as they were in Toledo, Ohio, when the city council of that place refused to grant a franchise to the Home Telephone Company.

GREENSBURG, PA.—The borough council has granted a franchise to the Johnstown & Pittsburg Long Distance Telephone Company. The extension of the lines from the eastern end of Westmoreland County to Pittsburg will begin in the early spring.

COMBINATIONS

EL DORADO, KAN.—The Butler County Telephone & Electric Company has purchased the five Butler County exchanges, as follows: El Dorado, Augusta, Leon, Douglass and Lathan. This with the company's large toll system comprises one of the best and largest Independent systems in Kansas connecting with adjacent systems in every direction, owning its own lines into Wichita. The capital stock of the company is \$50,000, owned by representative business men of the county. The company will make a great many extensions this year in which line materials and all kinds of exchange apparatus will be needed. The newly elected officers of the company are: Robert H. Hazlett, president; W. F. Benson, treasurer; O. R. Cline, secretary, and A. B. Ewing, superintendent. Mr. Cline is the original promoter of this system, and while he has been confined to his home for several months by illness, he is now able to direct much of the important work of the company.

REAT BEND, KAN.—The Great Bend Telephone Company has purchased the long distance toll line from Silica to Hoisington, connecting Hoisington with Great Bend, and Ellinwood and Silica with Great Bend from the Lyons Telephone Company, of Lyons, Kan.

EVERETT, PA.—The Bedford-Fulton Telephone Company and the Extension Telephone Company have been consolidated under the name of the former company.

ELECTIONS

MULBERRY, IND.—The Mulberry Telephone Company has elected Allen Troxell, president; A. M. Yundt, vice-president; J. M. Sims, treasurer; George Miller, secretary; F. M. Gable, general manager.

RIPLEY, IND.—The Ripley Farmers' Co-operative Telephone Company has elected Albert Leisure, Frank Cross, R. H. Phillips, H. C. Pitts, Nobel Basset, Murray Ball and Henry B. Phelps, directors.

BLOOMFIELD, IA.—The Citizens' Telephone Company of Bloomfield has elected N. H. Sheppard, president; C. C. McVay, vice-president; C. D. Evans, secretary; L. F. Christy, treasurer; S. S. Standley, C. E. Stockham, J. T. Hill, C. K. Gleason, D. W. Hartzler, C. C. McVay, E. S. Stockham, Evan Evans, J. W. Dumfriend and other directors.

BURLINGTON, IA.—The Burlington & Augusta Telephone Company has elected F. W. Romkey, president; Henry Nagel, vice-president; N. C. Hansen, secretary and treasurer; Henry Nagel, M. C. Hansen and E. W. Romkey, directors.

DOWS, IA.—The Morgan Farmers' Mutual Telephone Company, of Dows, has elected J. S. Capellen president; F. H. Jackborth, H. W. Lemke, George Rankins, W. P. Mendell, E. H. Capellan and Al. Korth, directors.

FREMONT, IA.—The Farmers' & Traders' Telephone Company has elected O. C. Cochran, president; Seth Randell, vice-president; T. O. Stewart, secretary; J. A. Gunn, treasurer.

LESLIE, IA.—The Leslie Telephone Company has elected G. W. Gardiner, of Osceola, president; E. T. Barnett, of Leslie, vice-president; E. M. Kennedy, of Osceola, secretary; T. F. Johnson, of Leslie, treasurer; G. W. Gardiner, C. H. Hodges, E. T. Barnett, Oscar Yates and T. H. Swain, directors.

RORBECK, IA.—The Marne & Elkhorn Telephone Company at a meeting held here elected Walter E. Potts, of Rorbeck, president; Alfred Long, of Marne, vice-president; S. C. Peterson, of Elkhorn, secretary; Chris. M. Hansen, of Elkhorn, treasurer.

WAVERLY, IA.—The Waverly Telephone system has elected James Gardiner, president; Edward L. Smalley, vice-president; J. F. Aumer, secretary, and J. F. Aumer, treasurer. A. A. Broadie, Burton E. Sweet, Edward L. Smalley, J. H. Shoemaker, James Gardiner, directors.

PORTLAND, ME.—The Northeastern Telephone Company has elected Thomas R. Brooks, president; Lewis A. Goudy, vice-president and general manager; Edwin W. Gearhart, treasurer; Oscar H. Hersey, clerk; John P. Pearle, chief engineer; W. H. Park, assistant treasurer, and Alfred A. Durgan, superintendent.

WEST SUMMER, ME.—The Oxford County Telephone Company, at a meeting held here elected R. G. Stephens, of Sumner, clerk; A. Hersey, of Buckfield, treasurer. An annual 5 per cent. dividend of the stock has been paid.

SAGINAW, MICH.—The Valley Telephone Company has elected J. E. Davidson of Bay City, president; John L. Jackson, of Saginaw, vice-president; R. F. Johnson, of Saginaw, secretary and manager; C. B. Curtis, of Bay City, treasurer. The company declared a semi-annual dividend of 3½ per cent.

FAIRMONT, MINN.—The Fairmont Telephone Company has elected W. Ward, president; P. R. Madison, vice-president; David S. Wade, secretary and treasurer.

COLUMBUS, NEB.—The Independent Telephone Company has elected C. J. Garlow, president; T. J. Cottingham, vice-president; A. Anderson, treasurer; G. T. Everett, secretary and manager. New stock to the amount of \$2,500 has been subscribed for extension.

PLATTSMOUTH, NEB.—The Plattsouth Telephone Company has elected T. E. Parmalee, president; C. C. Parmalee, vice-president; J. N. Wise, secretary, and T. H. Pollock, treasurer and general manager. The company declared the usual 10 per cent. dividend.

TABLE ROCK, NEB.—The Table Rock Telephone Company has elected W. C. Fellers, president; William Sutton, vice-president; Dr. W. H. Wilson, second vice-president; Charles J. Wood, secretary; C. H. Bernard, treasurer.

ALBION, N. Y.—The Lakeside Telephone Company has elected W. A. Tuttle, president; F. B. Conate, vice-president; S. A. Coe, secretary and treasurer and superintendent of construction.

BRANCH, N. Y.—The Branch Telephone Company has elected Bert Jackson, president; Joe Burley, vice-president; N. W. Barrows, secretary; J. M. Barrows, treasurer.

BYRON, N. Y.—The Byron Telephone Company has elected H. C. Norton, president and manager; Dr. Prince, vice-president; A. G. Steele, secretary, and L. W. White, treasurer.

FAIRHAVEN, N. Y.—The Lake Ontario Telephone Association held a meeting recently and elected W. R. Younglove, president; J. M. Phillips, vice-president; F. L. Mixer, secretary, A. Hawley, treasurer; William Hawley, line superintendent. In the spring a number of new rural lines will be built, one from Red Creek to Wolcott, one from Red Creek to Cato, and one from Red Creek to Fairhaven.

MIDDLEBURG, N. Y.—The Middleburg Telephone Company has elected Dr. C. S. Best, president; Daniel D. Frisbie, vice-president; Dow Beekman, secretary; J. Edward Young, treasurer; C. W. Vroman, manager.

VIRGIL, N. Y.—The State Road Home Telephone Company held a meeting recently and elected F. D. Marcey, president; C. B. Weiland, secretary.

FREMONT, OHIO.—The Fremont Home Telephone Company has elected S. Brinkerhoff, president; C. M. Russell, vice-president; R. J. Christy, secretary; J. M. Sherman, treasurer.

KENTON, OHIO.—The Kenton Telephone Company has elected James L. Moore, president; W. A. Norton, vice-president; A. G. Wessling, secretary and treasurer. Several additions were decided on as soon as weather permits.

PAINESVILLE, OHIO.—The Painesville Telephone Company has elected F. A. Searle, president; Dr. D. J. Merriman, vice-president; W. R. Radcliffe, treasurer, and C. M. Grauel, secretary and manager.

DELMAR, PA.—The Delmar-Hoytville Telephone Company has elected Frank H. Martin, of Antrim, president; D. S. Fields, of Delmar, secretary; John Focht, of Delmar, treasurer.

INDIANA, PA.—The Indiana Telephone Company has elected J. A. Findley, Thomas Hart, M. C. Watson, Ernest Stewart, A. W. Mahon, directors.

ALEXANDRIA, S. D.—The Hanson County Telephone Company has elected P. A. Zollman, president; W. S. Hille, vice-president; V. K. Stillwell, treasurer; G. H. Montgomery, secretary.

CLARKSVILLE, TENN.—The Home Telephone Company has elected H. C. Merritt, president; B. F. Gill, vice-president; Lancey Lord, secretary and treasurer. In the spring a line will be constructed from Bowling Green, Ky., to Guthrie.

ST. JOHNSBURY, VT.—The Citizens' Telephone Company has elected George W. Buzzell, president and treasurer; Harland B. Howe, secretary.

GRAND RAPIDS, WIS.—The Telephone Toll Line Company has elected the following officers: T. A. Lipke, president; C. F. Krueger, secretary and treasurer; E. C. Starks, superintendent. The directors and stockholders

were very much pleased with the showing made during the past year, and some extensions and repairs were decided upon.

STEVENS POINT, WIS.—The Stevens Point Telephone Company has elected E. M. Kopps, president; C. A. Hamaker, vice-president; F. F. Groelle, secretary, and F. A. Krembs, treasurer.

VANVOORHIS, W. VA.—At the annual meeting of the stockholders of the Farmers' Telephone Company held recently the following directors and officers were elected: Isaac Van Voorhis, president; Asa M. Sterling, vice-president; Dr. W. A. Brown, secretary; E. F. Moore, treasurer and general manager; Springer Morris, Morton Van Voorhis, A. S. Mapel, Capel Holland, F. Blaine St. Clair.

PERSONAL

L. T. APPLE, who has had charge of the assembling rooms for the Hipwell Manufacturing Company, Allegheny, Pa., has resigned and has accepted the superintendency of telephony for the C. C. & St. L. Big 4 Railroad. Mr. Apple began his new duty the 1st of February, with headquarters at Springfield, Ohio. He is an experienced telephone man, and is well qualified to fill his new position.

L. E. TRAVER, who has been manager of the Chicago Telephone Company at McHenry, Ill., during the past two years, has been made manager of the exchange at La Grange. R. E. Burkitt, formerly of Marengo, is now manager of the McHenry exchange.

MISCELLANEOUS

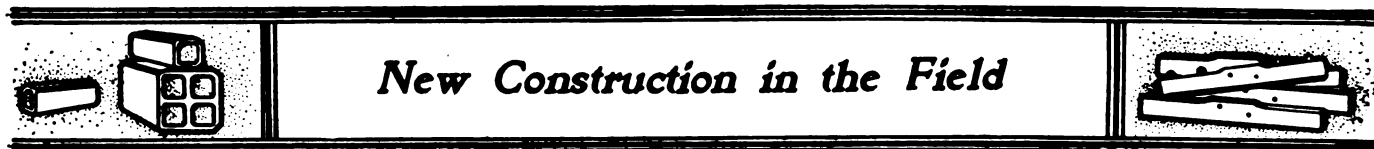
WABASH, IND.—The Central Union Telephone Company, which is operating in this city without a franchise, has paid no attention to the repeated notifications of the Common Council that it must accept the franchise it asked for several months ago or get out of the city. At a recent meeting of the Council the clerk was directed to give the company final notice, and unless the officials sign the franchise as it stands, the city authorities will begin the removal of all poles and wires in the streets and alleys.

REEDS CITY, MICH.—Fire destroyed the local Citizens' Telephone exchange. Loss about \$10,000.

ALEXANDRIA, MINN.—The Interurban Telephone Exchange Company has filed an amendment to its articles of incorporation changing its place of business from Holmes City to Alexandria.

UNDERGROUND

BOSTON, MASS.—The Board of Aldermen have passed an order "That the wire commissioner be requested to notify any company maintaining overhead wires to remove said wires, if any exist, within 30 days from date of passage of this order."



ATHENS, GA.—L. D. Goodrum of Pennsylvania has started a movement in Athens for the construction of an Independent system. Mr. Goodrum is with a large telephone company in Pennsylvania, and has instructions from his company to work up the local field for the purpose of establishing a complete system in Georgia.

GEORGIA, IND.—The Georgia Telephone System has constructed a line to Proctor from Shoals, and will continue to Huron as soon as the weather permits.

SOUTH McALESTER, IND. TER.—The South McAlester-Eufala Telephone Company will construct a through wire from South McAlester to Hartshorne.

DES MOINES, IA.—The directors of the Mutual Telephone Company and the Independent toll line owners interested in the Mutual Company will meet here to perfect plans for the reorganization of the company and for deciding on improving the system.

SHADY GROVE, IA.—The Buchanan County Farmers' Mutual Telephone Company is planning the construction of a great many rural telephone lines this season. Among the probable lines is one from this place to LaPorte. At a recent meeting of the company the following officers were elected: Dr. Herdon, president; A. D. Mount, secretary; John Robison, treasurer; Dan Peek, new director.

HAGERSTOWN, MD.—W. A. Hawkins of this place is considering establishing a telephone system throughout Washington County to serve farmers. If successful he will likely extend the system to Franklin and other counties.

CARO, MICH.—The Moore Telephone system will rebuild its exchange here, making all lines metallic and using cables and underground conduits.

CHARLOTTE, MICH.—W. W. Libhart, manager of the Eaton County Telephone Company is planning to build a line from Charlotte to Eaton Rapids to connect with the Citizens' Rural Telephone Line.

CORUNNA, MICH.—The Farmers' Telephone Company has its line from Nicholson nearly completed to Bancroft and they are desirous of extending it to Corunna.

GRAND HAVEN, MICH.—The Citizens' Telephone Company of Grand Rapids is planning for entering Grand Haven the coming spring and competing with the Bell Company.

ELK RIVER, MINN.—Farmers of Elk River are planning to construct a telephone line to Nowthen connecting with central by Elk River. The merchants of Anoka are also discussing the construction of a line to Nowthen.

MOTLEY, MINN.—The Enterprise Telephone Company of this place has contracted to construct a telephone line from Leader to Hazel Dell. Many other branch lines are proposed to be built the coming summer.

MERIDIAN, MISS.—The proposition of Messrs. Jones and Winter, of Chicago, to establish an Independent telephone system here is meeting with approval. F. E. Gressett of this city is leading a movement towards having an Independent telephone system constructed.

MAYWOOD, MO.—The Citizens' Telephone Company of North Missouri, with principal office in Canton, has just installed a new switchboard at Durham, and will install one at this place this spring. The company is now constructing several new lines and adding many new telephones. It recently purchased the exchange at Ewing at a cost of several hundred dollars. The Ewing exchange has about 150 subscribers.

NEWTON, N. J.—W. D. Haggerty, president of the Farmers' Union Telephone Company of Sussex County, was in Butler recently with a view to establishing a system in that place.

TROY, N. Y.—The Schenectady Railway Company will install a telephone system on its Troy and Albany interurban lines.

SPENCER, N. C.—E. C. Hines, until recently manager and part owner of the Spencer Telephone System, has decided to go to Albuquerque, N. M., where he will re-enter the telephone business. He will take with him Earl Spiggood and Jerome Workman.

KINDRED, N. D.—A meeting was held here recently to promote a rural telephone line to connect Kindred and Norman. S. E. Ulsaker was elected president, and Oscar Husebye secretary and treasurer.

MONMOUTH, ORE.—Arrangements are completed for another rural telephone company to be constructed from here about six miles north. Plans are also being made to construct a line west.

AUTUMN LEAVES, PA.—William Kingsbury, of Autumn Leaves, has secured enough money by subscription to erect a telephone line from Hancock to Autumn Leaves and Starlight.

COATESVILLE, PA.—The United Telephone & Telegraph Company of Philadelphia contemplates installing a common battery system here.

CEDAR BAYOU, TEX.—Citizens of this place are planning to construct a telephone line to connect with La Porte.

LUNENBERG, VA.—The Lunenberg Telephone Company has been asked to construct a line from Bruceville to Green Bay.

DELAN, WIS.—An Independent telephone company is preparing to establish a line among farmers four miles northwest of this city to connect with the Walworth County Line.

MANITOWOC, WIS.—The Silver Creek Telephone Company has applied to the city council for a franchise. The company is constructing a system to Silver Lake west and southwest of the city.

PULLMAN, W. VA.—The Pullman and Washburne Telephone Company is extending its line to Harrisville, where it will connect with the West Virginia Western Telephone Company.

CONNELL, WASH.—A new telephone line, connecting Connell with Lind, Hatton, Kahlotus and other towns to the north and east, has been completed. Moody Bros. of this place, are the promoters, and have announced their intention of stringing wires on to Pasco via Mesa and Eltopia. When this line is completed every postoffice in Franklin County will be connected, except Page, on Snake River.

PITTSBURG, PA.—The Pittsburg & Allegheny Telephone Company has just completed arrangements for adding about 5,000 subscribers to its list by connecting with the National Telephone Company of Wheeling, W. Va.

WHEELING, W. VA.—W. C. Handlan, manager of the National Telephone Company, announces that the company has connected its lines with those of the South Penn Telephone Company. In a few days it will be connected with the Home Telephone Company, of Wellsburg. It is the intention of the National to build a number of new lines during the coming summer.

EDGARTON, WIS.—The Edgerton Telephone Company has decided to purchase a new switchboard at a cost of \$5,000.

OAKDALE, PA.—There is talk of connecting the local telephone system of Robinson and North Fayette townships with Oakdale by a line connecting with the Chartiers Company. The Chartiers Telephone Company contemplate many improvements and extensions which will cover a very wide territory.

WEST ALEXANDER, PA.—It is proposed to organize a local telephone company to construct a system here. Most of the stock is already subscribed, and a canvass is now being made for subscribers. The company will construct lines for farmers' service.

CANTON, S. D.—The addition to the Canton Co-Operative Telephone line has been completed to Fairview, and it starts in with thirteen subscribers.

ETNA MILL, VA.—The stockholders of the Richmond & Aylets Telephone Company held a meeting at Engfield recently. Lucien P. Hall was elected to solicit subscriptions to the capital stock of the company and to collect money to extend a line from Etna Mills to Hanover.

BISHOP, CAL.—Elton Baker, Jack Black and A. M. Given and others will construct a telephone line connecting Bishop and Big Pine.

HOPEDALE, ILL.—W. H. Mount, president of the Farmers' Telephone Company of Hopedale, was in Tremont recently, with a view of constructing an exchange there.

RANSOM, ILL.—The Ransom Telephone Company will install an exchange in Blackstone.

CHEYENNE, WYO.—Assistant Superintendent of Telegraph Sheldon of the Union Pacific is installing a system of telephones between Cheyenne and Laramie for the purpose of aiding in the handling of trains. The telephones are attached to the telegraph wires and conversations can be held without interrupting the telegraph business. They are so arranged that six persons can carry on conversations at the same time without interfering with one another.

PRINCETON, IND.—The Knox County Home Telephone Company and the Princeton Home Telephone Company have joined their long distance wires at White River. This connection is the last important link between Indianapolis, and Evansville and as soon as the new Municipal Company at Evansville get their plant installed first-class service will be opened between these two important centers.

SHELBYVILLE, IND.—The Mutual Telephone Company of this city will construct another line between this city and Indianapolis early in the

spring. The company will place a new switchboard in the exchange with a capacity of 1,100 lines.

EXLINE, IOWA.—The Exline Telephone Company will construct a new line.

PALMER, IOWA.—A rural telephone line will be built to Pomeroy next spring.

REINBECK, IOWA.—The Reinbeck Telephone Company will establish a local exchange here.

WHAT CHEER, IOWA.—The Associated Telephone Companies are talking of constructing a new line to meet one from Delta.

BELOIT, KAN.—The Union Telephone & Telegraph Company is constructing a trunk line from Abeline to Topeka. It will consist of three No. 10 copper metallic circuits, one connecting at Topeka with the Kansas City exchange, one with the Topeka exchange direct, and another for local or inter-county business.

BRAZILTON, KAN.—The Brazilton & Gerardton Telephone Company is extending lines to Hepler, Walnut, Porterville, Stark, Hiattsville, Redfield and Fort Scott, taking on all farmers with a wire for through private service. J. W. Wampler is president of the company.

HILLSDALE, MICH.—A meeting of rural telephone companies of the county was held here recently to organize a company to install an exchange in this city.

ELLENDALE, MINN.—Farmers in this vicinity will construct a rural telephone line between Ellendale and Hartland.

LEMONVILLE, MO.—There is talk of constructing a new telephone line west from this place.

FAIRPORT, N. Y.—The Inter-Ocean Telephone Company, which will install an exchange in this village, has rented offices and will commence construction in the near future.

NIAGARA FALLS, N. Y.—Lloyd Elwood Knapp and Harry S. Grant, engineer and assistant engineer, respectively, of the Orr Telephone Company of Buffalo, are here to commence preliminary arrangements for the establishment of a new exchange. A franchise will be asked from the city council and a company will be organized under the laws of Ontario, Canada, to be controlled by Canadians, and to install a local exchange.

THOMASVILLE, N. C.—The Thomasville Telephone Company has decided to rebuild its line over a new and more direct work to High Point.

LA MONT, OKLA.—The La Mont Rural Telephone System has issued a call for a meeting to be held here of all telephone lines on the system, together with the rural companies with which they exchange, for the purpose of organizing a general company in order that the various lines may be connected together.

BLAIRSVILLE, PA.—A local Independent telephone company has decided to make extensive improvements on its system.

HARRISBURG, PA.—The United Telephone & Telegraph Company has asked the city council to be allowed to present bids for supplying city telephones used in connection with fire department and offices.

STROUDSBURG, PA.—A new telephone line will be built from Bossardsville to Saylorburg.

BRYAN, TEXAS.—The Bryan Telephone Company has completed a new full metallic line from Bryan to Mumford for the accommodation of planters in the Brazos Bottom. Other lines will be put up soon. The Searcy Edge and Macy lines are being overhauled. Mrs. J. Koppe, of Kerten, has constructed a line to Bryan, and many other lines are being talked of.

CUNNINGHAM, WASH.—Farmers in this vicinity will construct a line from here to Leone Valley.

CHARLESTON, W. VA.—The linemen of the Baltimore & Ohio Railroad Company have placed in position, at the tower in the Wheeling yards, one of the newly invented telephones, which are being experimented with on other roads, and the new invention will be given a thorough test. The instrument is connected up with the telegraph switchboard, the same as a telegraph instrument, and is equipped for simultaneous transmission. It is understood that the Baltimore & Ohio is figuring on putting one of the new style telephones in each of its telegraph stations.

WHEELING, W. VA.—The People's Telephone Company will install an exchange in Weston.

DODGEVILLE, WIS.—The Dodgeville & Union Mills Telephone Company will construct another line from Union Mills to Dodgeville.

DIRECTORY OF THE HOME TELEPHONE COMPANY, BLOOMINGTON, ILL.

Nothing forms so good an evidence of the extension of Independent telephony as the perusal of the directories of the various Independent companies. That of the Home Telephone Company, of Bloomington, is just before us and contains a list of toll line connections which are formidable. In addition, the various subscribers in both Bloomington and Normal are listed alphabetically arranged, in the first half of the catalogue and under postoffice headings in the last part.

BOOK NOTICE

LABORATORY EXERCISES WITH PRIMARY AND STORAGE CELLS. By Karl E. Guthe, Assistant Professor of Physics, University of Michigan, published by George Wahr, Ann Arbor, Mich., 1903. 56 pages, 18 illustrations. price, 45 cents.

This is a manual describing various exercises and tests which are intended to form the basis of a liberal course for students in electro-chemistry and battery testing and is chiefly interesting to those pursuing, or having in view, a college course rather than to the practical man. The author assumes Carhart's "Primary Batteries" as a text book, and proceeds to elaborate from and to describe methods of testing and examining batteries of all descriptions, including methods of measuring current, electromotive force. Internal resistance determination and the embracing calculations whereby the energy of various combinations of metals and electrolytes to be used in batteries can be determined is given attention.

TRADE NOTES

THE KELLOGG SWITCHBOARD & SUPPLY COMPANY announces that after an absence of about four months, Mr. Paul W. Bossart has again assumed the duties of manager of its Philadelphia office.

THE NATIONAL WIRE CORPORATION of New Haven, Conn., announces that on February 1st, 1904, its offices will be removed to Room 1103 in The Engineering Building, 114 Liberty street, New York City. The telephone number will be 7620 Cortlandt. The company will be pleased to receive all inquiries at the new office and will be prepared at all times to furnish information or to make quotations when desired.

THE SWEDISH-AMERICAN TELEPHONE COMPANY of Chicago has sent us its latest publication, illustrating not only switchboards but giving detailed descriptions of the various pieces of apparatus which it offers. Swedish-American receivers and transmitters are almost too well-known to need description. We notice a new and artistically designed long distance wall set arranged in a case so as to be compact and substantial.

THE WESCO SUPPLY COMPANY of St. Louis has just issued its new Telephone and House Goods Catalogue, No. 60, which is a very complete and attractive book. The price book and discount sheet covering the catalogue is fastened inside of the back cover, making it one of the handiest and most useful telephone catalogues issued. The house goods shown in the book cover an up to date line of annunciators, bells, and electric novelties, which make very interesting additions to the telephone apparatus and supplies listed therein. It can be had for the asking.

THE C. A. MANUFACTURING COMPANY of Austin, Texas, announces a method of preserving old poles which will be welcome to the exchange manager who is endeavoring to preserve an old and decayed line. The preservative appears, as would naturally be expected, to be a creosote compound. It is to be applied by excavating a hole a few inches from the base of the pole where it enters the ground and thoroughly saturating the pole with the compound, which it is well to work in with a brush. It is stated that this treatment will repair decay to a very marked degree.

THE AUTOMATIC ELECTRIC COMPANY of Chicago has recently sold complete equipment for 1,000 stations to the Auburn Telephone Company, Auburn, N. Y. It has also received an order for 800 stations from the Ideal Construction Company, Hopkinsville, Ky. These figures are for present installation. About seven years ago the Auburn Company installed an Automatic board with an ultimate capacity of 400 stations. This was soon filled, and in order to increase the list of subscribers the telephone company purchased two manual boards of two operators' positions each and connected them with the Automatic switchboard by means of trunk lines.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY is always unique in the apparatus which it offers. It is just placing on the market a semi-portable telephone set particularly adapted for street railway work and for contractors of all kinds. The set consists of a sub-station back board that carries a pair of boxes either of which can be at pleasure detached. In the upper box the generator, transmitter and other apparatus is so arranged as to be completely solid and secure. The lower box contains a reel upon which is placed a number of yards of flexible conductor. This instrument may be mounted in a temporary position and carried around from place to place, at pleasure.

THE NORTH ELECTRIC COMPANY has just issued Bulletin No. B 22 describing the apparatus which it offers. The first portion of the catalogue is chiefly devoted to the various types of switchboards and is profusely illustrated with handsome half tones. Both common battery and magneto lamp signal boards are shown varying from one to a half dozen positions. Target signal boards are also shown, and in each case a view of the switchboard is given from which the general arrangements of the apparatus can be seen. In connection with each board the special features of the keys, cords, plugs and other appa-

ratus are fully illustrated. The central station manager and wire chief will be well repaid by sending a request to the North Electric Company for a copy of this book.

THE STANDARD UNDERGROUND CABLE COMPANY held its annual stockholders' meeting at the general offices of the company in the Westinghouse Building, Pittsburgh, Pa., on January 26th, 1904. The statement of the company's operations for the year was presented, showing that the company did a gross business of nearly \$9,000,000 during the year 1903, and that dividends were paid on its capital stock aggregating 12 per cent.; and that the company's assets aggregate the handsome sum of \$3,604,457.00, with only \$375,344.00 of liabilities, apart from capital stock. It has no outstanding notes, mortgages, bonds, or preferred stock. The board of directors elected for the ensuing year is as follows: Mark W. Watson, John B. Jackson, James H. Willock, Robert Pitcairn, J. N. Davidson, John Moorhead, B. F. Jones, Jr., Joseph W. Marsh and W. A. Conner. The only change in the board is represented by the election of W. A. Conner, who has been at the head of the manufacturing department of the company since 1884. The meeting of the board of directors for purpose of organization was held on the 29th inst., and the former officers were re-elected as follows: Mark W. Watson, president; Joseph W. Marsh, vice-president and general manager; Frank A. Rinehart, treasurer, and C. M. Hagen, auditor. This company was the pioneer in the manufacture of underground cables for all classes of electric service, having been formally organized in January of the year 1882, although much experimental work had been done by Richard S. Waring, the founder of the company, prior to its organization. Its reputation for high-class manufacture in each of its departments—comprising bare copper wire, weatherproof wires and cables, rubber insulated wires and cables, and both paper and rubber insulated lead covered cables for telephone, telegraph, electric light and power service, together with the favorable location of its factories—Perth Amboy, N. J.; Pittsburgh, Pa., and Oakland, Cal., and its strong financial condition, place it in a most favorable position to command a large business in its various lines.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—1,000 series telephones in the best of condition and ready for immediate delivery, \$4.00 each. Address, C. H. A., care THE AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Building, Chicago, Ill. 127

TREE WIRE—TREE WIRE—TREE WIRE.—Double or Triple Braid double galvanized Iron Wire at the RIGHT PRICE. R. B. ABBOTT, 1735 Kenmore avenue, Chicago. 136

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

SAVE A DOLLAR OR \$0. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. Gildart Brothers, Albion, Mich. 131

WANTED.—Man with experience, thoroughly competent to take charge of testing room in large telephone factory. State wages expected, also experience. THE VOUGHT-BERGER COMPANY, La Crosse, Wisconsin. 133

WANTED.—Position by man with fourteen years' experience, good practical, as well as theoretical, knowledge of the business; associated the past four years with one of the largest Independent companies in the country. Would accept a position in the engineering department of a manufacturing company. Good circuit man and have had installing experience. Territory west of Chicago preferred, and contract required. References given. Address, Box 132, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 132

POSITION WANTED.—By a man with seven years' experience as wire chief in a large Western city with a modern plant. He is familiar with all branches of the business. Address Box 135, care of AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 135

The time is getting short. Pole planting weather will soon be here.


Hadn't you better send in your inquiries now and get the Pole business off your mind? While we stand by our reputation for prompt shipment, there's always a chance for delays that are utterly beyond our prevention. "A bird in the hand."

May we not hear from you?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.


"From the Stump to the Line"



PITTSBURG & LAKE SUPERIOR IRON CO **ESCANABA MICHIGAN**

PRODUCERS AND WHOLESALEERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building, **CHICAGO, ILL.**

C. J. HUEBEL CO.

MENOMINEE, MICH.

<p>YARDS:</p> <p>MENOMINEE, - MICH.</p> <p>NATHAN, - MICH.</p> <p>STAGER, - MICH.</p> <p>SWANSON, - MICH.</p>	<p>Producers and Wholesalers of</p> <p>IDAHO CEDAR POLES</p> <p><i>45 FEET AND LONGER</i></p> <p>MICHIGAN WHITE CEDAR POLES</p> <p><i>ALL LENGTHS</i></p>	<p>WE HAVE</p> <p>25,000 POLES</p> <p>CONCENTRATED</p> <p>AT OUR</p> <p>MENOMINEE YARD</p>
----------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

YELLOW PINE CROSS ARMS

WE MAKE 'EM

AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACING			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	28		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	28 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.

CHATTANOOGA, TENN., U. S. A.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

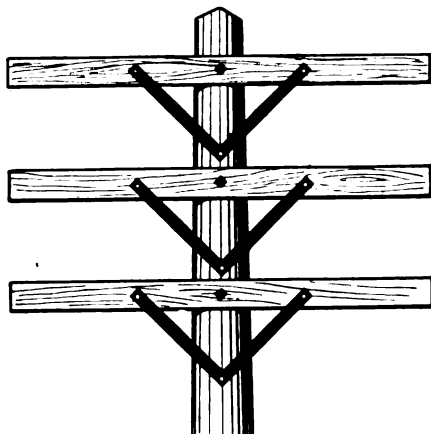
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING :: :: :: CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

I
D
A
H
O

M
I
C
H
I
G
A
N

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

MICHIGAN AND IDAHO POLES,

Piling, Cross-arms, Pins, Brackets,
Insulators and General Supplies.

THE TOWNSEND CEDAR AND SUPPLY CO.,

1101 Monadnock Bldg.,

CHICAGO, ILL.

OEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you.
Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**

152-158 Lake St., Chicago, Ill.

Factory, Sycamore, Ill.

PRICE LIST AND SAMPLES ON APPLICATION

IDAHO RED CEDAR POLES

20 to 80 FEET LONG

I can ship from

FOUR POLE YARDS

on Great Northern, Northern Pacific and Union Pacific Railways. Write for Prices.

F. L. Churchill, Heron, Montana

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

The Morse
Cedar
Co.

**CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.**

Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

POLES

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.



Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ♡ ♡ ♡

74 CORTLANDT STREET,


NEW YORK CITY

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♡ ♡ ♡

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.
167 Dearborn St.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR** " "
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

A Great Educator

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

The American Telephone Journal

*116 Nassau Street,
New York City.*

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE

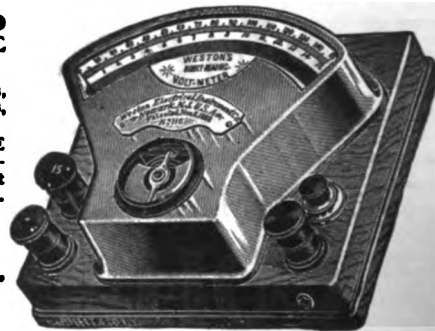
DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of energy.

**Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.**

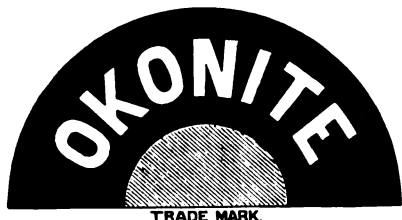
BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION



The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

SIGNS OF THE TIMES:—

The American Telephone Journal is growing better with each issue. Yet the price still remains the same, 52
issues for 100 cents. Hadn't you better send a dollar now?

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.



LOUIS M. PIGNOLET

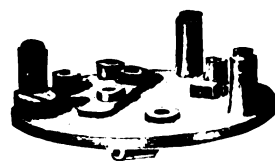
Originator of the Voltmeter Habit

80 Cortlandt Street New York City

These Pieces Were Not Turned, Bored, Reamed, or the Gears Cut---



each piece was made complete in one operation and they are ready for assembling without further work.



Each piece consumed a couple of seconds, or so, in its making. They are "Die Castings" from Franklin. They are cast in steel dies and they are accurate down to .001 of an inch and every one alike.



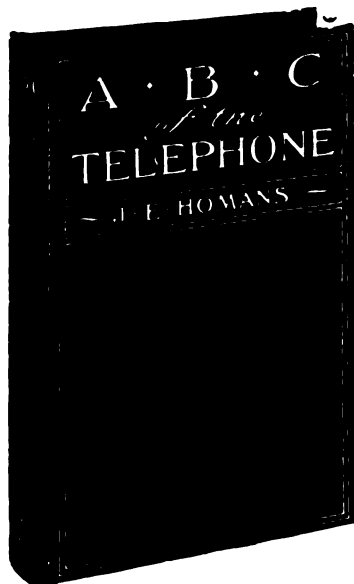
Your round-about-way of machining can be done away with by using Franklin Castings.

May we send you a couple of examples of the work?

Franklin Mfg. Company

200 S. Geddes St.

SYRACUSE, N. Y., U. S. A.



New and Revised Edition of the A. B. C. of the Telephone and a year's subscription to

THE AMERICAN TELEPHONE JOURNAL

\$1.50

The regular price of the "A. B. C." is \$1.00. This edition has been revised and brought up-to-date by the author, and is now one of the best books on telephony in print.

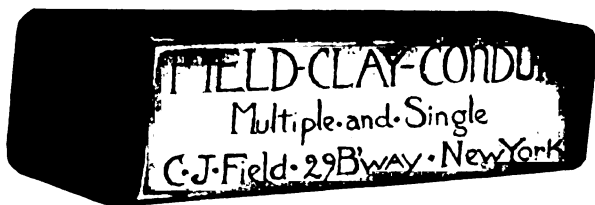
THE AMERICAN TELEPHONE JOURNAL

is the best telephone paper published. The subscription price is \$1.00 for 52 numbers (1 year). Cut this out and send in your name now for this special offer.

Name.....

P. O. Address State.....

NOTE—This offer is not good on renewals of subscriptions



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarred by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S
(Patent)

**CONNECTORS
AND
TERMINALS**

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.
Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

Bituminized Fiber Conduit

FOR UNDERGROUND CONSTRUCTION

ELECTROLYSIS-PROOF WATER-PROOF

A Smooth Laminated Insulator of Unchanging Durability

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate.

The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty percentum of freight and handling charges and twenty percentum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

170 Broadway, New York, N. Y.

336 Macy Street, Los Angeles, Cal.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the WESTERN ELECTRIC COMPANY

ADVERTISERS' DIRECTORY—Concluded

<p>Sand Point Cedar Co., Sand Point, Idaho. Sterling, W. C., & Son, Monroe, Mich. Townsend Cedar & Supply Co., Chicago, Ill. Valentine-Clark Co., Chicago, Ill. Wisconsin Timber & Land Co., Mattoon, Wis. Worcester, C. H., Co., Chicago, Ill.</p> <p>POWER PLANTS. Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>PROTECTORS. American Electric Tel. Co., Chicago, Ill. Cook, Frank B., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. Nagel, W. G., Electric Co., Toledo, O. Sterling Electric Co., Lafayette, Ind.</p> <p>PAY STATIONS. Nagel, W. G., Electric Co., Toledo, O.</p> <p>SEALS. Middleton & Co., J. W., Chicago, Ill.</p> <p>SIGNS. Ingram-Richardson Mfg. Co., Beaver Falls, Pa.</p> <p>SOLDER, RESIN CORE. Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>STATIONERY. Shaw-Walker Company, Muskegon, Mich. Telephone Printing Co., Defiance, Ohio.</p> <p>STEEL. Leslie A. C., & Co., Montreal, Can.</p>	<p>STOCK CERTIFICATES. Middleton & Co., J. W., Chicago, Ill.</p> <p>SWITCHBOARD DROPS. Columbia Electric Co., McCordsville, Ind.</p> <p>SWITCHBOARDS. American Electric Tel. Co., Chicago, Ill. Automatic Electric Co., Chicago, Ill. Central Tel. & Elect. Co., St. Louis, Mo. Conn. Tel. & Electric Co., Meriden, Conn. Ericsson Telephone Co., N. Y. Holtzer-Cabot Elec. Co., Brookline, Mass. International Telephone Mfg. Co., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. Monarch Tel. Mfg. Co., Chicago, Ill. Nagel, W. G., Electric Co., Toledo, O. North Electric Co., Cleveland, O. Sterling Electric Co., Lafayette, Ind. Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. Swedish-American Tel. Co., Chicago, Ill. Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONES. American Electric Tel. Co., Chicago, Ill. Automatic Electric Co., Chicago, Ill. Central Tel. & Elect. Co., St. Louis, Mo. Chicago Writing Machine Co., Chicago, Ill. Connecticut Telephone & Electric Co., Meriden, Conn. Couch, S. H., Co., Boston, Mass. Electric Appliance Co., Chicago, Ill.</p>	<p>Ericsson Telephone Co., N. Y. Fahnestock Transmitter Co., New York. Holtzer-Cabot Electric Co., Brookline, Mass. International Telephone Mfg. Co., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. Monarch Telephone Mfg. Co., Chicago, Ill. Nagel, W. G., Electric Co., Toledo, O. North Electric Co., Cleveland, O. Sterling Electric Co., Lafayette, Ind. Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. Swedish-American Tel. Co., Chicago, Ill. Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONE BOOTHS. Yesbera Manufacturing Co., Toledo, Ohio.</p> <p>TELEPHONE HOLDER. Chicago Writing Machine Co., Chicago, Ill.</p> <p>TELEPHONE SUPPLIES. American Electric Tel. Co., Chicago, Ill. Automatic Electric Co., Chicago, Ill. Barr, W. J., Mfg. Co., Cleveland, Ohio. Bissell Co., The F., Toledo, O. Central Tel. & Elect. Co., St. Louis, Mo. Chicago Writing Machine Co., Chicago, Ill. Columbia Electric Co., McCordsville, Ind. Connecticut Telephone & Electric Co., Meriden, Conn. Couch, S. H., Co., Boston, Mass. Electric Appliance Co., Chicago, Ill. Ericsson Telephone Co., N. Y. Fahnestock Transmitter Co., New York. Holtzer-Cabot Elec. Co., Brookline, Mass.</p>	<p>International Telephone Mfg. Co., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. Leslie, A. C., & Co. Montreal, Can. Monarch Tel. Mfg. Co., Chicago, Ill. Nagel, W. G., Electric Co., Toledo, O. North Electric Co., Cleveland, O. Sterling Electric Co., Lafayette, Ind. Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. Swedish-American Tel. Co., Chicago, Ill. Vought-Berger Co., La Crosse, Wis. Yesbera Mfg. Co., Toledo, O.</p> <p>TERMINALS. American Electric Tel. Co., Chicago, Ill. Cook, Frank B., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. McIntire Co., C., Newark, N. J. Nagel, W. G., Electric Co., Toledo, O. Sterling Electric Co., Lafayette, Ind.</p> <p>TRANSMITTER ARMS. Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>WIRE. American Electric Tel. Co., Chicago, Ill. Bissell Co., The F., Toledo, O. Chicago Insulated Wire Co., Chicago, Ill. Kellogg Switchboard & Supply Co., Chicago, Ill. Nagel, W. G., Electric Co., Toledo, O. National Wire Corporation, New Haven, Conn. Okonite Co., New York. Roehling's Sons Co., John A., Trenton, N. J. Seovill Mfg. Co., Chicago, Ill. Standard Underground Cable Co., Pittsburg, Pa.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The Tomb OF the WIRE

Earth to earth
cast by the hand
of experience
Lays the ideal
Conduit System.



G. M. GEST

Expert Subway Contractor

Broadway Chambers Bldg., 271 Broadway, NEW YORK

Union Trust Bldg., CINCINNATI, OHIO

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK



YOU WILL LIKE
OUR

Leich **4** Party

Selective Telephones
IF YOU USE THEM

WRITE FOR OUR NEW SELECTIVE BULLETIN

American
Electric Telephone Company
CHICAGO

THE AMERICAN TELEPHONE JOURNAL

To be known—to keep known

is the manufacturer's road to success.
Do your salesmen ever have to intro-
duce your firm to the buyer?

If so, you are not properly known.
Advertising depends mostly on select-
ing the right medium. Read what a
prominent supply house says about
telephone mediums:

"We have found The American
Telephone Journal to be the best
advertising medium we have ever
used.

"THE W. G. NAGEL ELECTRIC CO.
"Dealers in Telephone Supplies,
Toledo, Ohio."

We will leave it to you if this argu-
ment isn't convincing enough.

Contents, Page 2

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—FEBRUARY 20, 1904—CHICAGO Number 8

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION, ARTICLE I.....By Frank F. Fowle
CONVENTION OF WISCONSIN INDEPENDENTS
CONSOLIDATED TELEPHONE CO. CONVENTION
BREAKS CABLE-PULLING RECORD
TREE GROUNDS AND HOW TO CLEAR THEM.....By F. R. Pine
CONDITIONS OF COMPETITION AT NEVADA, IOWA

The Operating Field:

HEPLER, KANSAS, MUTUAL COMPANY
NORTHEASTERN IOWA ASSOCIATION'S METTING
TROUBLE AT WABASH, IND., FOR BELL CO.
A COMBINED TOLL STATEMENT AND RECEIPT

PUPIN'S PATENT SUSTAINED IN GERMANY
TRI-STATE SHOWS UP WELL
MICHIGAN INDEPENDENT ASSOCIATION ANNOUNCEMENT
THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 128.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

The best illustration of that time worn saying "Money talks" is found by spending a few more cents per phone and getting our "Eaco Telephones that talk."

A talkative talker in every sense and the few cents extra investment is readily discernible to the man who knows "points" in telephones. The transmitter and receiver are important points, but there must be something back of them, and the added cost over "cheap" telephones is found not only in the two talkative points but also in the backing—thus do we multiply the talk. Look in the battery box and you find 1900 dry batteries.

Short, crisp pointlets from our telephone typewriter will aid in the digestion of the thought of "paying more." Correspondence suggested.

ELECTRIC APPLIANCE COMPANY, CHICAGO

COOK PROTECTORS

STANDARD

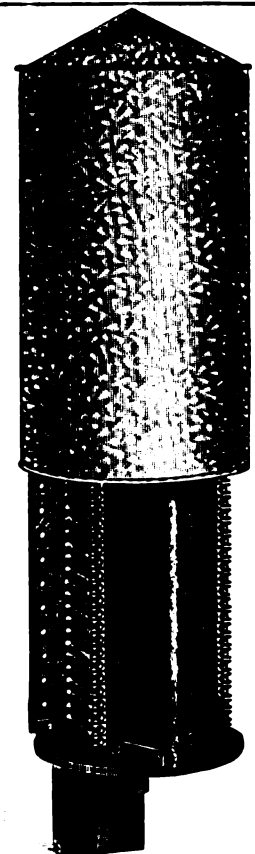


Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST. CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

What the President says

"I am very much gratified with the success the Atlanta Telephone and Telegraph Company has attained within the last six months. It has pretty nearly doubled its business in that time, and its cash receipts have grown immensely for the short time this company has been able to give service with its new switchboard and its new telephones. The time has come when it is not a question of getting business, but a question of constructing lines and putting in telephones for those who apply to us for service."

"GROWTH IN ATLANTA, GEORGIA," by Pres. Jerome Simmons.



Main Exchange of Atlanta (Ga.) Telephone and Telegraph Company

The above exchange built and installed by the Stromberg-Carlson Tel. Mfg. Co.

It would be useless to attempt to compete with a modern Bell exchange with inferior apparatus. The above clipping denotes the success of a competing independent exchange when equipped with the best apparatus obtainable.

Our Bulletin No. 5-B on Central Energy Telephones tells why they are superior to all others. Mailed upon request.

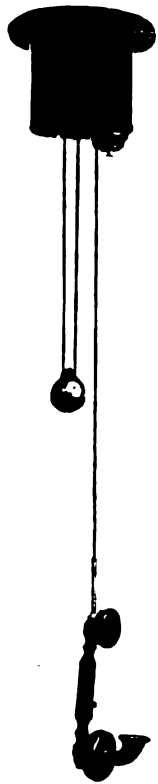
Stromberg-Carlson Tel. Mfg. Co.

General and Eastern Office

Rochester, N. Y.

Sales Dept.

Chicago, Ill.



Get a Pendant

Office

FOR THE

Store

Residence

**WRITE
US
NOW**



*Efficient, Durable,
Elegant, Inexpensive,
Portable and Adjustable*

The Vought-Berger Company

Makers of High Grade Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN



All Right for Quality

Well Balanced Equipment

**TELEPHONES
THAT NEVER
WEAR OUT**

TRY ME

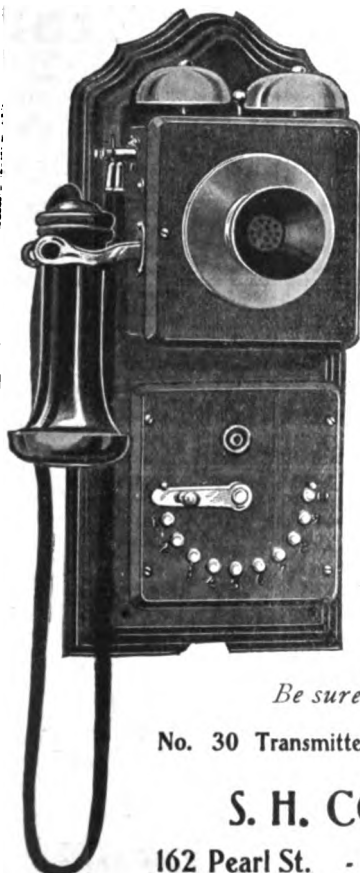
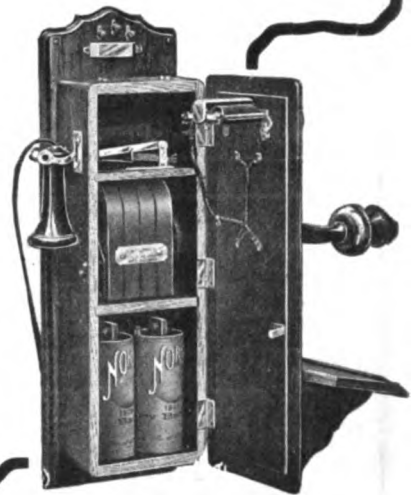
WRITE
TO-DAY

**THE
NORTH
ELECTRIC
CO.**

CLEVELAND,
OHIO, U. S. A.

156 St. Clair St.

C N 160



No. 12 Telephone for Interior Systems

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

*Send us a
trial order*

Don't fail to send for bulletin 6, describing No. 12 Telephone.

We make a lot of good things.

Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

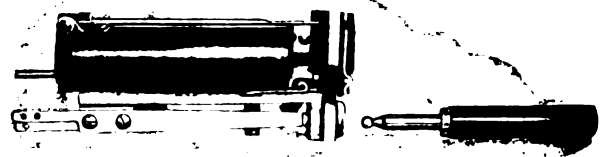
S. H. COUCH CO.

162 Pearl St. - - BOSTON, MASS.

INTERNATIONAL Telephone Mfg. Co.

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**

CHICAGO, ILL.

Multiple Switchboards

T
E
L
E
P
H
O
N
E
S

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

T
E
R
M
I
N
A
L
S



PROTECTIVE DEVICES



The Survival of the Fittest

Takes place in every city or town where two telephone companies compete for patronage. That company which gives the best service will survive. The best telephone service in the world to-day is Automatic, and we installed the exchanges which give it.

From these facts draw a moral.

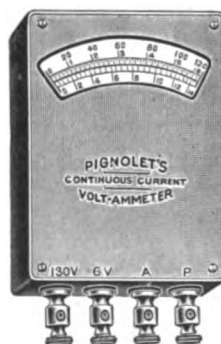
Automatic Electric Co.

CHICAGO, U. S. A.

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.



LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

Kellogg Switchboard and Supply Company

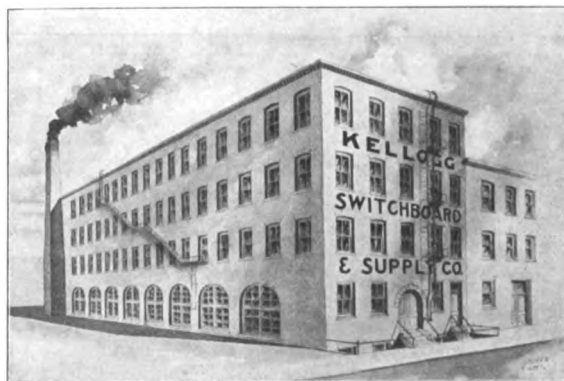
CHICAGO, ILL.



MAIN FACTORY AND GENERAL OFFICES,
CONGRESS AND GREEN STREETS.



FACTORY NO. 2.



GENERAL WAREHOUSE.

The Kellogg Switchboard and Supply Company have just rented and equipped Factory No. 2 with 34,000 square feet of new floor space. This space, together with our main factory, is entirely devoted to switchboards and telephones. We have also increased our warehouse capacity to 35,000 square feet, and have filled same with a complete stock of our standard make of telephones. Our entire plant equipped throughout with modern machinery and manned by the most expert mechanics affords unexcelled facilities for the manufacture of the highest grade of telephone apparatus.

Our increased factory capacity enables us to make everything not in stock at very short notice. We are prepared to fill from stock all orders for telephones of standard types. Orders for magneto or common battery switchboards will be filled with unusual despatch.

We manufacture no inferior grades. Our apparatus as to quality, durability and beauty will be strictly maintained. Write for prices.

**KELLOGG SWITCHBOARD and SUPPLY COMPANY,
CHICAGO**

346 Broadway
New York

Electric Building
Cleveland

Keystone Telephone Building
Philadelphia



MONARCH COMPACT TYPE TELEPHONES

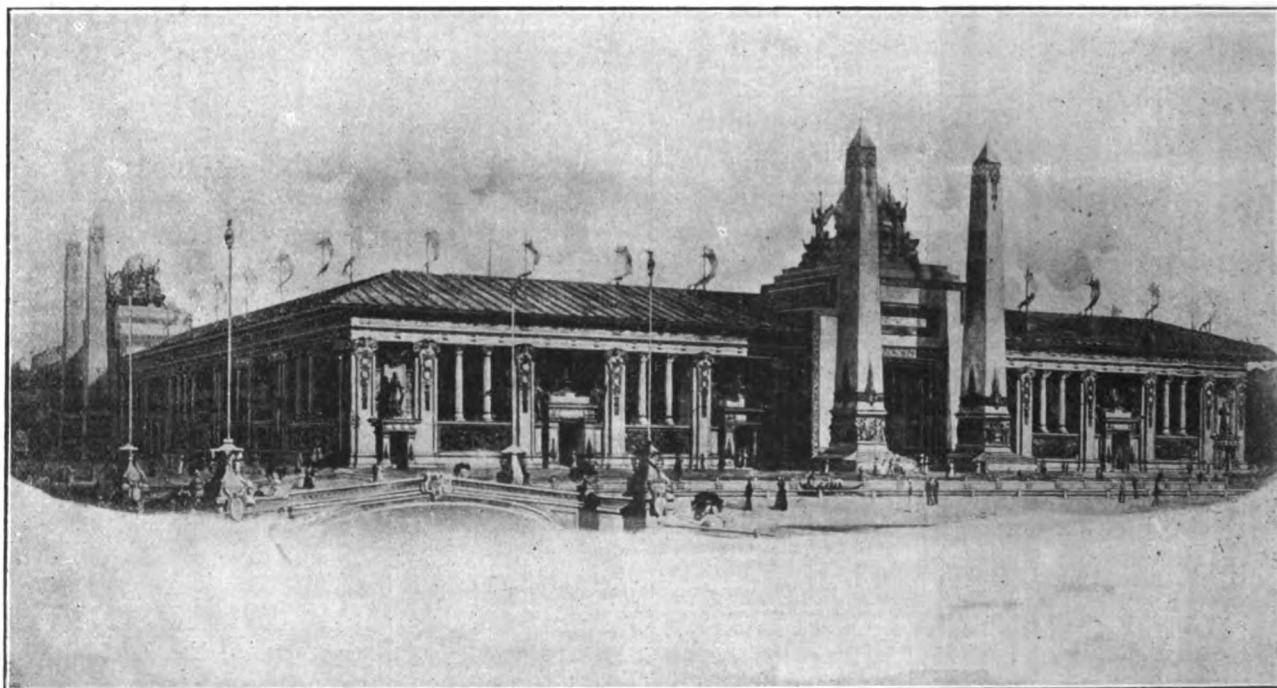
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.
14 So. Clinton Street CHICAGO, ILL.

World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

TELEPHONE
INSTRUMENTS



TELEPHONE
SUPPLIES

PALACE OF MINES AND METALLURGY

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus 909 Market Street, St. Louis, U.S.A.
Dealers in "Everything Used with Telephones"

Write Today—Let Us Tell YOU All About the

Very Best Desk Set

On the Market

**We Make
Many Other
Good Things
in the Line
of
Telephones**



Century No. 85

It Will Pay You to Learn About It

CENTURY TELEPHONE CONSTRUCTION CO.

536 ELLICOTT SQUARE, BUFFALO, N. Y.

Ready Pole Seats



**Strongest Pole
Seat Made. All
Iron, adjustable
to any Pole.**

**READY REELS, TOOLS, &c.
CABLE AND TELEPHONE
SUPPLIES**

The W. G. Nagel Electric Co.

416 Huron Street, - TOLEDO, O.

ADVERTISERS' DIRECTORY

American Conduit Co.	37	Eastern Telephone Mfg. Co.	11	Klein, Mathias, & Sons	33	Roebbling's, John A., Sons Co.	11
American Electric Teleph. Co.	40	Electric Appliance Co.	3	Leslie, A. C., & Co.	—	Sand Point Cedar Co.	30
Am. School of Correspondence	—	Elkin Machine Co.	33	Lewis Lumber & Mfg. Co.	33	Scovill Mfg. Co.	2
American Vitrified Conduit Co.	39	Ericsson Telephone Co.	10	Lindsay Brothers Co.	32	Shaw-Walker Co.	—
Automatic Electric Co.	6	Fahnestock Transmitter Co.	34	McIntire, C., Co.	36	Standard Underground Cable Co.	—
Barr, W. J., Mfg. Co.	12	Field, C. J.	36	Maltby Lumber Co.	29	Stanton L. W.	34
Beidler, Francis & Co.	33	Fowler, John H.	32	Michigan Cedar Co.	33	Sterling W. C., & Son	33
Bissell Co., The F.	11	Franklin Rolling Mill & Fdy. Co.	31	Middleton, J. W., & Co.	34	Sterling Electric Co.	6
Butterfield, J. F.	34	Gest, G. M.	38	Miller Anchor Co.	—	Stromberg-Carlson Telephone Mfg. Co.	4
Camp, The H. B. Co.	39	Hemingray Glass Co.	—	Monarch Telephone Mfg. Co.	8	Swedish-American Tel. Co.	12
Central Mfg. Co.	—	Holtzer-Cabot Electric Co.	—	Morse Cedar Co.	33	Telephone Printing Co.	33
Central Telephone & Electric Co.	8	Huebel, C. J., & Co.	29	Nagel, W. G., Electric Co.	9	Valentine Clark Co.	30
Century Telephone Const. Co.	9	Hyde, C. H., & Co.	34	National Wire Corporation	11	Vought-Berger Co.	5
Chicago Insulated Wire Co.	33	Illinois Electric Specialty Co.	10	New Haven Novelty Machine Co.	2	Wanted, Situations, etc.	128
Chicago Writing Machine Co.	—	Imperial Finance & Cons. Co.	34	North Electric Co.	5	Weston Electrical Instrument Co.	34
Churchill, F. L.	33	Ingram-Richardson Mfg. Co.	12	Nungesser Electric Battery Co.	—	Wisconsin Timber & Land Co.	33
Cohn & Bock	33	Index of the Technical Press	—	Okonite Company	34	Worcester, C H., Co.	29
Columbia Electric Co.	—	Inland Steel Co.	32	Pacific Coast Pole Co.	30	Yesbera Mfg. Co.	12
Connecticut Teleph. & Electric Co.	—	International Telephone Mfg. Co.	5	Pignolet, L. M.	30	Cunningham Iron Co., Boston, Mass.	—
Cook, Frank B.	3	Kellogg Switchboard & Supply Co.	7	Pittsburg & Lake Superior Iron Co.	29	Field, C. J., New York.	—
Couch, S. H. Co.	5	Bissell Co., The F., Toledo, O.	—	Pittsburg Sewer Pipe & Conduit Co.	36	Gest, G. M., Cincinnati, O.	—
Crumb, W. H. Co.	34	Chicago Insulated Wire Co., Chicago, Ill.	—	CABLE SLEEVES.	—	Nagel, W. G., Electric Co., Toledo, O.	—
Cunningham Iron Co.	36	Kellogg Switchboard & Supply Co. Chicago, Ill.	—	Nagel, W. G., Electric Co., Toledo, O.	—	New Haven Novelty Machine Co., New Haven, Conn.	—
Dickey Clay Mfg. Co., W. S.	36	Nagel, W. G., Electric Co., Toledo, O.	—	CARD INDEX SYSTEMS.	—	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.	—
ANTISEPTIC ATTACHMENT.	—	National Wire Corporation, New Haven, Conn.	—	Shaw-Walker Co., Muskegon, Mich.	—	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.	—
West Disinfecting Co., N. Y.	—	Okonite Co., New York.	—	CLIMBERS.	—	CONNECTORS.	—
BATTERIES.	—	Roebbling's Sons Co., John A., Trenton, N. J.	—	Klein & Sons, Mathias, Chicago, Ill.	—	Cook, Frank B., Chicago, Ill.	—
Electric Appliance Co., Chicago, Ill.	—	Standard Underground Cable Co., Pittsburg, Pa.	—	Nagel, W. G., Electric Co., Toledo, O.	—	McIntire Co., C. Newark, N. J.	—
Illinois Electric Specialty Co., Chicago, Ill.	—	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	—	CONDUITS.	—	Nagel, W. G., Electric Co., Toledo, O.	—
Nungesser Electric Battery Co., Cleveland, O.	—	CABLE HANGERS.	—	American Conduit Co., Chicago, Ill.	—	CONSTRUCTION SUPPLIES.	—
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	—	Bissell Co., The F., Toledo, O.	—	American Vitrified Conduit Co., New York.	—	American Electric Tel. Co., Chicago, Ill.	—
BONDS.	—	Cook, Frank B., Chicago, Ill.	—	Camp Co., The H. B. New York.	—	Electric Appliance Co., Chicago, Ill.	—
J. W. Middleton & Co., Chicago, Ill.	—	Nagel, W. G., Electric Co., Toledo, O.	—		—	Franklin Mfg. Co., Syracuse, N.Y.	—
BRASS.	—	Standard Underground Cable Co., Pittsburg, Pa.	—		—		—
Scovill Mfg. Co., Chicago, Ill.	—		—		—		—
BOOTH.	—		—		—		—
Yesbera Mfg. Co., Toledo, O.	—		—		—		—
CABLES.	—		—		—		—
American Electric Tel. Co., Chicago, Ill.	—		—		—		—

WANT AND FOR SALE ADVERTISEMENTS, PAGE 128.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



**For Long
or Short
Distance
Work**

Combination wall and desk set, without hook in the magneto. Furnished with the Ericsson micro-telephone, which takes the place of a nickel desk set.

Cheap maintenance, absolute efficiency and perfect satisfaction is what is claimed of our telephones.

ERICSSON TELEPHONE CO.
INDEPENDENT

Mfrs. of Telephones and Telephone Parts for Magneto and Common Battery. Write for Catalog A.

296 Broadway, New York, N. Y.

ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

FILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

*Complete Stock
Always on Hand*

ILLINOIS ELECTRIC CO., 239 and 241 MADISON ST.
CHICAGO, ILL.

Distributors of Telephone Supplies and Construction Material

Eastern Telephone Manufacturing Co.

MAKERS OF

HIGH GRADE TELEPHONE EQUIPMENT

Series Telephones
Bridging Telephones

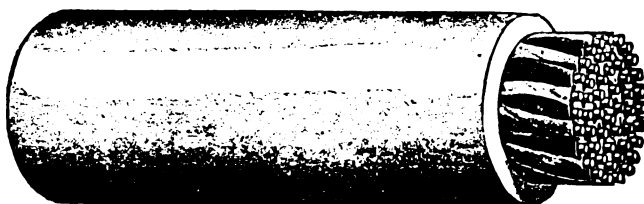
Common Battery Telephones
Special Designs

WE SOLICIT CORRESPONDENCE

WESTCHESTER

PENNSYLVANIA

Now
is the time
to
Buy



Our
National
Telephone
Cables

400 PAIR AND SMALLER

Need no introduction. May we quote on your specifications?

THE F. BISSELL COMPANY.

TOLEDO, O.

SELLING AGENTS

Bulletin 226 on

WIRES
CORDAGE
STRANDS
and
CABLES

will be sent pre-
paid on request

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO

YOU WILL FIND



SWEDISH AMERICAN APPARATUS

ALL OVER

*There's a
Reason.*

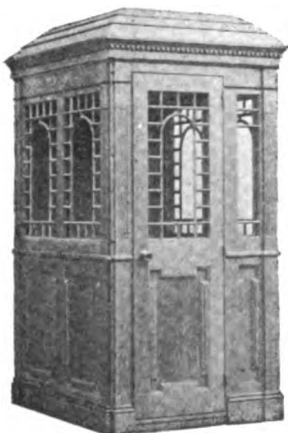
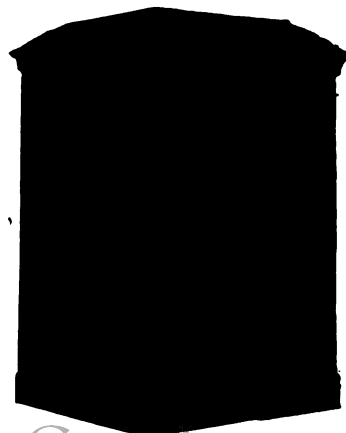
THE COUNTRY

*Get our Prices and Descriptive Matter.***SWEDISH-AMERICAN TELEPHONE CO., Chicago, Ill.**All the big Companies
use them!

ENAMELED IRON TELEPHONE SIGNS

Shall we
quote you?**INGRAM-RICHARDSON MFG CO.**
BEAVER FALLS, PA.**WE HELP TO MAKE**A Good
Telephone

ADDRESS "BARRARM," CLEVELAND

Telephone BoothsTelephone Booths***Is It Not the Part of Wisdom***and doesn't it pay to cater to the little peculiarities
of people? It tickles telephone patrons to find a
booth that offers privacy. It's a plain business
proposition for profit.When you are in a mood to cater and tickle, we
can furnish the goods. We wouldn't hesitate to
guarantee prices, quality considered.**YESBERA MFG. CO.**
TOLEDO :: :: :: OHIO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, FEBRUARY 20, 1904

NUMBER 8

CONVENTION OF WISCONSIN INDEPENDENTS.

THE Fifth Annual Convention of the Independent Telephone Association of Wisconsin, was held at the Hotel Pfister, Milwaukee, February 10th and 11th. The meeting brought together a large and enthusiastic representation of Independent telephone interests throughout the State, and was considered one of the most successful meetings in the history of the association. Reports from all sections of the State indicated a rapid growth of business during the past year, and the inauguration of many new exchanges.

The convention was called to order by President Richard Valentine, of Janesville. In his annual address, President Valentine reviewed the rapid progress made by the Independent companies during the year, stating that nearly all had greatly in-

creased their list of subscribers and that new exchanges had been provided in many communities not previously reached by Independent lines. A new exchange was completed during the year in the city of Kenosha and many new exchanges were being contemplated in the towns of the Fox River valley. Long distance connection with the Independent exchange at Chicago was assured for the coming summer. He commented at length upon telephone legislation; that the association attempted to secure at the last session of the legislature, and particularly upon the bill prohibiting discrimination in telephone rates, which passed the House by a majority of three, but was lost in the Senate by only one vote. He said that if the Independent companies throughout the State had been more active, the passage of this important measure would have been easily secured. He urged upon the members to interest themselves in the nomination and election of representatives favorable to this legislation and thought there would be little doubt of its being passed at the next session.

He said that by the end of this year the Wisconsin companies would have long distance service to Minneapolis, St. Paul, Du-

buque, Sheboygan, Racine, Kenosha and Chicago, and that if the business men of Milwaukee were alert to their interests and knew how extensive the Independent telephone business had become in the State they would demand the granting of an Independent franchise for the city of Milwaukee.

Mr. J. C. Harper, president of the Dane County Telephone Co. read a paper on the legislative prohibition of discrimination in telephone rates, and spoke at length on the measure which was drafted by a committee appointed at the last meeting of the Association, and for the passage of which the officers of the Association labored hard, only to be defeated at the last moment.

He commented upon the significance of the measure, stating that it would prevent or prohibit a company from extorting a high



Delegates to the Wisconsin Independent Convention.

rental in a city where it had a monopoly, so that it could wage cut-throat competition against the Independent companies. The bill proposed to regulate in a measure the telephone business and was constitutional in every detail. According to the proposed law, the cities of the State were to be divided into classes according to population and a telephone company operating exchanges in more than one city, would be required to charge the same rates for similar service in all the cities of the same class.

The paper was discussed at length by Mr. A. B. Ferdinand who spoke of his work with the legislators in behalf of the bill and stated that in view of the fact that Senator Green, president of the Green Telephone and Electric Co., had labored hard in opposition to the bill, his company being a member of the Association should be suspended therefrom. He made a motion to this effect which was unanimously carried.

Mr. W. F. Goodrich, of the La Crosse Telephone, Co., spoke in regard to the recent order issued by the postmaster-general, requiring all Independent telephones to be taken out of the post-offices and Bell instruments substituted in their place. He stated

that to his personal knowledge the postmasters at Minneapolis, St. Paul and La Crosse, in compliance with his order, had removed all Independent telephones.

Mr. Harper also discussed this order of the postmaster-general's and stated that upon inquiry at the postoffice at Madison, Wis., he learned that there had never been an instance of long distance communication between that city and Washington, a fact which demonstrated that there was no necessity for such long distance communication with the postoffice department. He believed that the order was inspired by the Bell Company to injure the Independent interests.

Upon the suggestion of Mr. Ferdinand, a committee to draft resolutions concerning the postmaster-general's order was appointed. This committee later reported the following resolution which was unanimously adopted:

WHEREAS, An order has been issued by the postoffice department, restricting the use of telephones in postoffices to the one in connection with Washington, D. C., making it a necessity for them to use only the Bell Company system, and whereas this, to the minds of Independent telephone men, appears to be an entirely unjust discrimination in favor of Bell Company interests, by reason of the postmaster-general's connection and sentiment toward that monopoly, thereby using an official position of the government to further interests detrimental to about 2,030,000 Independent telephone users as against about 1,230,000 users of Bell Company telephones in the country, and whereas the Independent companies being also long distance companies, but without connection with Washington, D. C., it is evident the smaller Independent companies, many times outnumbering the Bell companies, would be seriously deprived in not having connection with the postoffices in their larger adjacent cities upon which they are dependent, also that for the few calls for Washington necessary to postmasters it is unnecessary to retain the Bell connection solely for that purpose, also for the use of department inspectors, Independent lines can furnish in most cases the same service as the Bell Company and in many others the only connections for their use.

Resolved, That the Wisconsin Independent Telephone Association does vigorously protest against the unjust discrimination practiced in this instance; and be it further

Resolved, That the secretary of this association be instructed to send copies of this resolution to Theodore Roosevelt, Henry C. Payne, and to each member of this association, with instruction to personally send them to their United States senator and representative, together with written protests to them and to his excellency, Theodore Roosevelt; also that the secretary take up this matter with other Independent telephone associations.

THURSDAY'S DOINGS.

At the Thursday morning session, E. W. Wilder, of the Armour Institute, Chicago, read a paper on "Improvement in the Telephone Service." He stated that the main problem that the telephone man has to meet is to give the best service possible and yet secure a fair return on his investment. Quick service was essential and the operating expenses should not be cut down at the sacrifice of good service. In view of this fact, it was incumbent on exchange managers to keep themselves thoroughly informed in regard to the latest apparatus. He spoke favorably of the present lock-out systems which are being extensively installed and also urged the introduction of pay telephones. He pointed out that wherever the latter are in use, they are invariably found to be very profitable to the operating company. He paid some attention to the progress in underground construction, the cost of which has been much reduced during the last few years.

A motion to reconsider the action of the Association, suspending from membership State Senator J. H. Green, president of the Green Telephone and Electric Manufacturing Co., of Milwaukee, was introduced by Mr. F. J. Wittemore, a member of that company, and started a lively discussion. It was claimed by President Valentine, Secretary Winter, A. B. Ferdinand and others, that Mr. Green had opposed very strenuously the passage of the bill favored by the association prohibiting the discrimination of rates in cities of approximately the same size. They stated that Mr. Green not only voted against the measure but lobbied against it assiduously and claimed that no person who was so friendly to the Bell Company, ought to be allowed to remain a member of the Independent Association. "I would go even farther," said President Valentine, "I would like to see suspended from this organization every person who has anything whatever

to do with the Bell Company, and every so-called Independent company, which makes connections with the Bell Company. There are ten or twelve members of this Association who have toll connections with the Bell Company, and this fact is used by the Bell Company as an argument why others should do the same. In my opinion any person or company who has anything whatever to do with the Bell Company ought to be ousted from this organization."

The motion to reconsider the action of the Association, however, failed to carry. A motion was also made to have a committee appointed to hear what the Green Company had to say, if anything, but this was also voted down.

At the afternoon session, Secretary H. C. Winter, of Madison, Wis., presented the report for the year, showing a continued rapid growth of the Independent telephone business throughout the State, and also a gratifying increase in the membership of the Association, which now comprises 64 companies and 25 associate members, embracing approximately three-fourths of the telephone interests of Wisconsin.

He stated that during the past two years, 90 new telephone companies were incorporated in the State with a capitalization of \$1,500,000, and that to-day there are in Wisconsin 250 Independent telephone companies, with an approximate investment of \$3,500,000. There are 1,200 toll stations, 350 exchanges and 35,000 subscribers, of which latter number, about 8,000 are rural subscribers.

Mr. H. S. Durant, representing the Automatic Telephone Co., of Chicago, which has already installed an Independent system there, assured the members that his company would aid them in making connections with its Chicago exchange, and that all rumors to the contrary were without foundation.

Upon recommendation of the committee upon resolutions, the following was passed:

WHEREAS, The Independent telephone companies of Wisconsin have covered the State with a network of lines which connect local exchanges whose subscribers outnumber those of the Bell Company three to one, and

WHEREAS, The Independent toll lines will be connected with Chicago during the present year and are now connected with the wholesale cities of Dubuque, St. Paul and Minneapolis, all of which does and will divert much business from the city of Milwaukee to those cities of adjacent States; now therefore, be it

Resolved, That the citizens and business men of Milwaukee be advised of their growing loss of business to the metropolis of our State to the end that encouragement and aid shall be furnished any attempt to establish a local exchange in the city of Milwaukee with the Independent exchanges of the State; and be it further

Resolved, That a copy of this resolution be furnished the press of the city of Milwaukee.

Resolutions were also passed as follows:

WHEREAS, It is evident that certain persons unfriendly to Independent telephone interests have been in attendance upon the sessions of this convention, therefore be it

Resolved, That some rule or regulation be adopted so that only persons holding credentials endorsed by the company represented and by the secretary of the association shall hereafter be admitted to the meetings of this or future conventions of the association.

A. L. HUTCHINSON,
W. H. LITTLE,
HOWARD TEASDALE.

A committee consisting of G. W. Wilder, of Madison, F. S. Veeder of Mauston, and Charles Scherneck of Sun Prairie, was appointed to settle difficulties that may arise between the Independent companies. A committee was also appointed to examine and pass upon interstate connection contracts, consisting of H. Little of Portage, A. L. Hutchinson of Weyauwega, H. Teasdale of Sparta, William Van Middleworth of Racine, and A. B. Ferdinand of Milwaukee. A committee on legislation was appointed, consisting of J. C. Harper of Madison, A. L. Hutchinson of Weyauwega, A. B. Ferdinand of Milwaukee, M. D. Larson of McFarland, and James Cavanaugh of Kenosha.

Nine new companies were received into membership, as follows: The Mazomanie Telephone company, the Kingston Telephone company, The Columbia County Telephone company, the

Independent Consolidated Telephone company of Weyauwega the Cambridge Telephone company, the F. Bissell Company of Toledo, O., the Fulmer-Kuester-Schroeder company of Florence, and the Signalphone Telephone company of Milwaukee.

Officers were re-elected and two changes were made in the executive committee. The list is now as follows: Richard Valentine, Janesville, president; H. G. Slater, Waupaca, vice-president; H. C. Winter, Madison, secretary-treasurer; C. W. Twining, Monroe; G. Huette, Sheboygan; J. C. Harper, Madison; W. F. Goodrich, La Crosse; Julius Thielman, Merrill; John M. Baer, Appleton; E. A. Miller, Hixton, and J. C. Crowley, West Superior, executive committee.

LIST OF TELEPHONE COMPANIES REPRESENTED.

Badger State Telephone & Telegraph Co., Neillsville, Wis.; W. L. Smith.
Badger Telephone & Telegraph Co., Milwaukee; E. Sippley.
Beloit Telephone Co.; J. E. Carr.
Brodhead Telephone Co.; J. C. Murdoch, O. C. Schulz, Walter Bliss.
Central Wisconsin Telephone Co., Hixton, Wis.; E. A. Miller.
Central Wisconsin Telephone Co., Portage; W. J. Bell.

Consolidated Independent Telephone Co., Weyauwega, Wis.; A. L. Hutchinson, John Kidd, O. Morrison, Wm. Reuther.
Winnebago County Telephone Co., Winnebago, Wis.; A. B. Ferdinand.
East Valley Telephone Co., New Prospect; E. D. Smith.
Cambridge Telephone Co.; G. W. Wilder.
Citizens Telephone Company, Sheboygan, Wis.; G. Huette.
Oxford-New Haven Telephone Co., Oxford, Wis.; W. J. Bell.
Pewaukee-Sussex Telephone Co., Pewaukee; Alex. Caldwell.
Columbia County Telephone Co., Morrisonville, Wis.; W. R. Chipmen.
Belleville Telephone Co., Belleville, Wis.; H. J. Ulrich, S. E. Miller.
Two Rivers Telephone Co., Two Rivers, Wis.; C. F. Kirst.
Orfordville Telephone Co.; F. A. Cole.
Calumet Telephone Co., Johnsburg, Wis.; J. J. Schoofs.
Stoughton Independent Telephone Co., Stoughton, Wis.; E. Sipperly.

MANUFACTURERS REPRESENTED.

International Telephone Company; H. H. Davenport.
Sterling Electric Company; W. E. Doolittle.
Electric Appliance Co.; S. A. Dinsmore, J. B. McMulleh.
Automatic Electric Co.; H. S. Durant.
Central Electric Co.; W. W. Geisse, J. W. Mason.
Illinois Electric Co.; C. W. Bacon.
Vought-Berger Co.; M. I. Berger, D. W. Campbell, A. Meinaman.



Group of District Superintendents and Exchange Managers of the Consolidated Telephone Company Who Attended the Convention of That Organisation at Buffalo, N. Y., Feb. 13. For Convention Report See Next Page.

Citizens Telephone Co., Racine, Wis.; Wm. Van Middlesworth, A. T. Gills.
Citizens Telephone Co., Kenosha; Jas. Keelyn.
Dare County Telephone Co., Madison, Wis.; J. C. Harper, Hirman Nelson, H. C. Winter.
Dane Co. Rural Telephone Co.; J. C. Harper.
Eastern Wisconsin Telephone Co., Kiel, Wis.; L. C. Schrem, A. A. Paulson.
Edgerton Telephone Co.; F. W. McKinney, B. C. Brown, T. B. Earle, W. A. Shelley.
Friendship Telephone Co.; Wm. J. Bell.
Interstate Telephone Co., Winona, Minn.; F. M. Morrison.
Interstate Telephone Co., Sun Prairie, Wis.; Chas. Shernecker, A. L. Hutchinson.
Juneau Electric Co., Mauston, Wis.; F. S. Veeder, A. G. Loomis, I. C. Baldwin.
La Crosse Telephone Co., La Crosse, Wis.; W. F. Goodrich.
Menominee Ridge Telephone Co., Iron Ridge, Mich.; E. A. Croll.
Monroe Telephone Co., Monroe, Wis.; W. P. Bragg, C. W. Twining.
Monroe Co. Telephone Co., Sparta, Wis.; H. Teasdale, C. M. Beebe, G. W. Loomis.
People's Telephone Co., Rio, Wis.; J. L. Farrington.
Portage Telephone Co.; E. H. Warner, W. H. Little, F. H. Runkle.
Rock Co. Telephone Co., Janesville, Wis.; Richard Valentine, H. C. Willitz.
Rock Co. Farmers' Telephone Co., Janesville, Wis.; Richard Valentine.
United Telephone Co., Monroe, Wis.; P. J. Weirich.
Waupaca Citizens' Telephone Co.; H. J. Slater, R. J. Havenor.
United Telephone Co., Hyde Park, Ill.; C. W. Forbes.
Kingston Telephone Co.; W. R. Sims, E. J. Joslen, O. W. Joslen.

Adjustaphone Company; F. W. Pardee.
Stromberg-Carlson Tel. Mfg. Co.; D. C. Gould, H. A. Jones.
The F. Bissell Company; M. S. Walker.
Electric Supply Co.; L. W. Burch.
Elliott Addressing Machine Co.; R. St. John.
Signalphone Company; A. D. Weller.
Standard Telephone Co.; J. H. Parish, W. A. Taylor.
American Electric Telephone Co.; C. C. Garst.
Norstrom Lockout Telephone Manufacturing Co.; Wm. Herron.
Andrae & Sons Co.; Herman Andrae.
Green Telephone Electric Co.; F. J. Whittemore.
Miller Anchor Co.; G. H. Miller.
Roebing's Sons Co.; Wm. H. Slingluff, Bond Wisler.
Eureka Electric Co.; H. Rosenow.
Monarch Telephone Mfg. Co.; E. E. Yaxley, W. H. Trimm.
Holtzer-Cabot Electric Co.; E. R. Harding.
Fulmer-Kuester-Schroeder Co.; D. M. Fulmer.

TELEPHONES AS CHRISTMAS GIFTS.

HERE is what a Fort Collins, Colo., newspaper says about it: "The telephone company did a rushing business just before Christmas. The latest thing is to give your friends a telephone for a present, and like everything new it took in Collins, and a large number of telephones were put in the houses in this way."

CONSOLIDATED TELEPHONE CO. CONVENTION

IT is not very often that we hear of a single telephone corporation holding a convention of its district managers and it is a particularly rare occasion when we hear of a convention of this nature having an attendance of its own superintendents to the number of forty-five. A good many State Telephone Conventions do not gather together that number of delegates, and yet the Consolidated Telephone Co. of Buffalo, N. Y., at a convention of its district managers, on Saturday, the 13th inst., had that many present. The photograph on the previous page shows some of the telephone men present.

The following papers were read:

Hugh Taylor, Buffalo, N. Y., "Exchange Accounting."

H. M. Bennett, Hornellsville, N. Y., "Methods of Our Operations, and How to Meet Them."

F. S. Bronson, Geneva, N. Y., "The Advantage to Exchanges in Development of Toll Business."

E. F. Chapman, Ithaca, N. Y., "The Necessity of Popularizing the Independent Telephone Business with the Public."

J. H. Wright, Jamestown, N. Y., "Remunerative Subscribers' contracts."

B. L. Moore, Buffalo, N. Y., "Proper Care of Construction Material."

B. B. Daggett, Avon, N. Y., "Exchange Subscribers and How to Get Them."

W. W. Kidney, Buffalo, N. Y., "Points in Maintenance and Operations of Switchboards."

F. D. Cross, Corning, N. Y., "Duties of Managers in Operation of Exchanges."

Geo. Austin, Buffalo, N. Y., "Methods of Obtaining Toll Business."

A. M. Taylor, Penn Yan, N. Y., "Farmer Lines, Their Value and How to Organize Them."

V. H. Calhoun, Rochester, N. Y., "Methods of Locating and Clearing Toll Line Trouble."

A. H. Sawtelle, Sayre, Pa., "Necessity for System in Exchange Management."

I. B. Whiting, Ithaca, N. Y., "How to Handle Complaints of Subscribers."

Details of some of the more interesting of these papers will be given in THE AMERICAN TELEPHONE JOURNAL, at a later issue. Saturday evening, after the convention, the delegates were banqueted at the Ellicott Club by Mr. B. G. Hubbell, president of the organization.

This organization has spent a vast sum of money during the past two years in building a comprehensive and complete telephone system for Central and Western New York. It has taken town by town, and developed the local situations to their utmost capacities; and has extended its long distance lines to all points in this section of the State. Each of its local systems has been built upon the most improved construction specifications—common battery systems have been used almost exclusively and out

of the fifty thousand telephones that it has connected to its long distance system, it is probable that forty thousand of these instruments are of common battery type.

The toll line development of the company is done under the name of the Inter-Ocean Telephone and Telegraph Company. The construction of these long distance lines is the very best. The poles used are thirty feet high eight inches in diameter at the top and of cedar and chestnut, and nothing but No. 10 hard drawn copper wire is used.

The Consolidated Company has its own factory for the manufacture of magneto and common battery systems, known as the Century Telephone Construction Company. It builds all parts of telephone apparatus, including multiple common battery switchboards.

With this amount of construction, done in the past two years, the tremendous amount of energy displayed in this line of work can be readily appreciated, and as the successes attending this line of business have been so pronounced in its competition with the Bell organization, the company is planning to develop the remaining portion of its section with even greater rapidity than in the past.

To give an idea of the manner in which the Independent telephone business has been developed in New York State, we cite, herewith, some of the places recently developed, showing the population, number of Bell subscribers and number of Independent subscribers:

Town.	Population.	Independent.	Bell.
Hornellsville	11,000	1,124	300
Salamanca	4,000	416	50
Friendship	1,000	250	4
Corning	11,000	913	300
Penn Yan	4,000	609	50
Canandaigua	6,000	454	100
Jamestown	22,000	2,136	900
Sherman	760	365	1
Cortland	9,000	948	16
Waverly	4,000	1,064	200
Geneva	10,000	685	100
Wellsville	3,000	325	150

The directors of the Consolidated Telephone Company are as follows:

A. D. Bissell, president People's Bank, of Buffalo, N. Y.; T. S. Fassett, (Smith-Fasset Lumber Co.), Towanda, N. Y.; Chas. Adsit, President First National Bank, of Hornellsville, N. Y.; Chas. E. Austin, President Garretson-Mexico Co., of Buffalo, N. Y.; Martin Carey, of Bissell, Carey & Cook, Attorneys, Buffalo, N. Y.; J. P. Dudley, (Standard Oil Co.), Buffalo, N. Y.; K. F. Gill, (John Gill's Sons Co.) Cleveland, O.; Luther Allen, President Bankers' National Bank, of Cleveland, Ohio; H. D. Critchfield, (Automatic Electric Co.), Chicago, Ill.; B. G. Hubbel, President.

TRANSPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION*

By FRANK F. FOWLE.

I.—INTRODUCTION ON THE NATURE AND THE PROPERTIES OF TRANSMISSION LINES FORMULAE FOR INDUCTANCE AND CAPACITY OF SINGLE LINES

A TRANSMISSION line is characterized by its electrical properties, of which there are four to completely determine its action. These four properties are termed Resistance, Leakage, Inductance and Capacity. The resistance of the line is a function of the length, the diameter of the wire, the material of which it is made and the temperature. Wire

tables give the resistance of all commercial sizes of wire at temperatures within the range met in practice; and this need not be dwelt upon.


The Leakage, or more properly speaking, the leakage

* A paper read at the annual convention of the Association of Railway Telegraph Superintendents, May 15, 1903, at New Orleans, La.

conductance of a transmission line is the reciprocal of the insulation resistance. The insulation of lines whose physical condition is of the best is so high as to be negligible, excepting the condition of wet weather. The ordinary measurements of the leakage resistance are in the nature of the measurement of a high resistance and are so common as to need little comment. The ordinary method of determining insulation resistance is the well known voltmeter method.

The third property of transmission lines, above mentioned, is inductance. A magnetic field is inseparably associated with an electric current. The magnetic field about a transmission line consists of closed lines of magnetic flux, which are linked with the circuit. Anyone of these closed lines lies in a plane perpendicular to the transmission line. The inductance may be defined as the total number of lines of magnetic flux which pass through or are linked with a unit length of the circuit when a unit current traverses the circuit longitudinally.

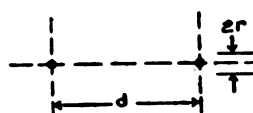
The formula for the inductance of a single aerial wire, composing a grounded circuit, may be expressed by:



$$L = (0.08045 + 0.7412 \log_{10} \frac{2h}{r}) 10^{-3} \quad (1)$$

Where L is the inductance per mile in Henries, h is the height of the wire above the earth and r the radius of the wire; h and r should be expressed in the same units.

The inductance of a two-wire aerial metallic line may be expressed by the formula:



$$L = (0.1609 + 1.482 \log_{10} \frac{d}{r}) 10^{-3} \quad (2)$$

Where L is the inductance per mile of line, d is the distance between the centers of the two wires and r is the radius of either wire; d and r should be expressed in the same units.

Both of the above formulæ are for wires made of non-magnetic material. The inductance of iron or steel wires is greater than that of copper wires of the same size. The formulæ for iron or steel wires may be found in the "Electrical Papers" of Oliver Heaviside. The logarithms are, as the subscripts denote, to the base 10, or common logarithms.

The effect of the earth on the inductance of a metallic circuit is less than a fraction of one per cent. if the wires are above the earth a distance greater than two or three times the distance between them. The inductance is decreased by the presence of the earth. These formulæ assume that there are no magnetizable substances within a distance of the circuits greater than several times the distance between the wires of a pair, or the height of a wire above the earth.

The fourth property of transmission lines, mentioned above,

is the electrostatic capacity. Every transmission line possesses the property of retaining or storing an electrical charge in the manner in which any condenser does so. The phenomena which takes place in the charging of a condenser is that of setting up electrical stresses in the dielectric between the plates of the condenser and producing an apparent displacement, as a result of the stresses, of the ether. The result of this at the surfaces of the condenser plates is the phenomena termed surface charge. It was Faraday's conception that the energy of a static charge was distributed throughout the volume of the dielectric composing the disturbed space between the plates. The analogy of this may be found in the displacement of a spring when subjected to an external force, work being done on the spring by the external force until the spring develops a reaction and opposes the impressed force with an equal and opposite force; and a state of equilibrium results. In this state of equilibrium the fibers of the spring are in a state of stress and the force exerted in producing the displacement, multiplied by the extent of the displacement,—that is, the distance through which the spring moved before equilibrium was established,—gives the work stored in the spring. This work is returned or delivered from the spring when it assumes its position of equilibrium and the external forces are zero.

The formula for the static capacity of a single aerial wire, composing a grounded circuit, is given by:

$$C = \left(\frac{0.03884}{\log_{10} \frac{2h}{r}} \right) 10^{-6} \quad (3)$$

Where C is the capacity of the line in Farads per mile, h is the height of the wire vertically from the earth and r the radius of the wire; h and r being expressed in the same units. A covering of insulation on the wire has the effect of increasing its capacity slightly.

The formula for the capacity of a two-wire aerial metallic circuit is formula No. 4.

$$C = \left(\frac{0.01942}{\log_{10} \frac{d}{r}} \right) 10^{-6} \quad (4)$$

Where C is the static capacity of the line in Farads per mile, d is the distance between the centers of the wires and r is the radius of either wire; d and r are expressed in the same units. This formula is modified when the wires are insulated and the capacity is slightly increased. The formulæ for these cases may be found also in Heaviside. Formulæ No. 3 and No. 4 are correct for wires of magnetic or non-magnetic material. The presence of the earth beneath an aerial metallic circuit increases the capacity very slightly, but less than a fraction of one per cent. if the wires are above the earth a distance at least several times the distance between them.

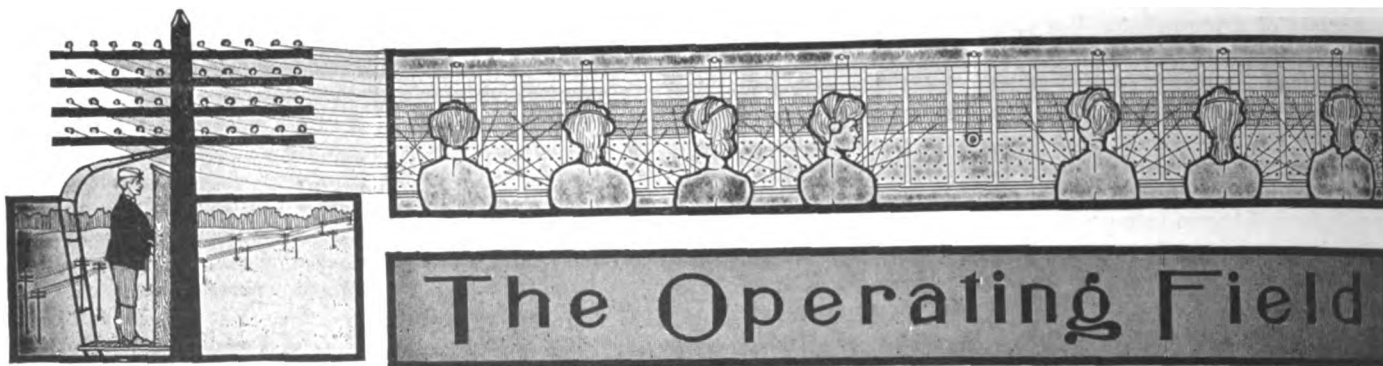
The assumption made in the deduction of the formulæ for static capacity is that there are no other wires in the immediate vicinity of those being considered. The effect of adjacent circuits is to increase the effective capacity of a line as given in formulæ 3 and 4, which will be shown later.

(To be continued.)

BREAKS CABLE PULLING RECORD

A NEW world's record for laying telephone cable was recently established in Salt Lake City, Utah, by a crew from the Independent Home Telephone company, under the direction of Chief Engineer Frank B. Hall. In seven hours and forty minutes 14,919 feet of 200-pair cable were laid by a force of nine men. The best previous record was made in St. Louis in 1898, when nine men and a foreman stretched 7,556 feet of 120-pair cable in eight and one-half hours. The cable was stretched by a gasoline hoist of six and one-half horse power. This city is the first

place in which a gasoline hoist has been used to stretch cable, and it is largely through the introduction of this machine that the crew of the Home Telephone company was able to eclipse the former record. The hoist is pronounced by Chief Engineer Hall as being the best method of pulling cable yet discovered. Another thing that aided the cablemen in their record-breaking feat is the condition of the streets of Salt Lake. They are broad and have few obstructions and for these reasons the cable could be laid much more easily than in most cities.



HEPLER KANSAS MUTUAL COMPANY.

AT a recent meeting of the Hepler Mutual Telephone Company, of Brazilton, Kansas, J. W. Wampler was elected general superintendent of all its lines and divisions. This company is managed by having all of its members stockholders. To become a member, a farmer must build and equip one mile of main line and the loop from his residence to the line, and agree to keep them in good repair. As soon as the company is able to connect two towns by having one member to each mile between the towns, the members on this line are taken into the company and their line is designated as a division and one of the members on that line is elected division superintendent, by virtue of which office he becomes a director of the company. The company owns all the lines, but each member puts in his own instrument and it is the member's private property, therefore, is kept in repair by its owner. The company puts up a trunk line on the same poles to connect the two towns for through business. A switchboard is installed at the main connecting towns, the switchboard being owned and controlled by the company. With the exception of some of the terminal points, all lines run into the local switchboard and a switching charge is made for connections to local exchange subscribers. The company is connecting all towns in the vicinity of Brazilton, Kansas, with from one to three lines and has 66 miles of poles set on which wire is now being placed, and 60 more miles of poles distributed, which will be set as soon as the line material arrives. There is an average of one member for every mile of line. As the company requires considerable material, it pays cash as it goes, and makes no debts, hence all supplies are purchased at the lowest prices.

At the recent meeting, three divisions were added to the company, and the directors were ordered to buy a new switchboard for Hepler. The company does business throughout Crawford and adjoining counties, in the southeastern part of the State. It commenced last May with three divisions and has been giving satisfactory service and has progressed remarkably well since the initial installation. Free service is given all members over the company's lines and also over a few lines of other companies with which the Hepler Company exchanges business. By virtue of the plan of organization and operation adopted, the company is continually growing with little financial outlay. If an individual wishes to become a member without building his mile of line, he may pay the company an amount equal to the cost of a mile of line and his connection from the line to his residence. Then he gets the same privileges as though he had built his mile. All parties not members, are charged a toll.

NORTHEASTERN IOWA ASSOCIATION'S MEETING.

ABOUT seventy-five members were in Dubuque, Iowa, recently, to attend the annual meeting of the Northeastern Iowa Independent Telephone Association. The meeting was presided over by Vic. Stevens, of Dubuque, who is president of the association. Little business was transacted at the morning session. Another session was held at 2 o'clock in the afternoon, when the regular programme was followed and several matters of interest to Independent telephone men discussed. President Stevens who had the arrangements in charge looked after the

entertainment of the visitors, and they were well pleased with their reception. At the afternoon session the programme was:

"Terminal Charges to Toll Line Companies by Exchanges," H. L. Greene, Waterloo. Discussion.

"Problems to Be Solved in the Future," C. P. Latta, Anamosa.

"What Are the Ear Marks of a Good Telephone Man?" Otto Borchert, Milwaukee, Wis.

"Are the Rates Now Charged by Independent Companies Remunerative, and Will They Continue to Be So?" W. G. Norman, Osage.

"Is There Anything New in the Farmer Situation?" F. E. Outing, Center Point.

The Northeastern Iowa Independent Telephone Association, though one of the younger associations of the State, is one of the most progressive. It was organized November 18, 1902, at Waterloo, Ia., beginning with a membership of fifteen companies, some of whom operate a half dozen different exchanges. Almost every exchange whose company has a membership in the association sends a representative to the meeting. The northeastern Iowa men take considerable pride in their association and exert every effort to perfect its organization. In point of attendance at its meetings the association stands well. Many new members have been added to the association during the past year. The following is a list of the companies represented in the membership:

- Central Iowa Telephone Company, Iowa Falls.
- Buchanan County Telephone System, of Independence.
- Gladbrook Telephone Company, Gladbrook.
- Home Telephone Company, Fairbank.
- Maquoketa Telephone Company, Maquoketa.
- Sumner Telephone Company, Sumner.
- Jones County Telephone Company, Anamosa.
- Dubuque Telephone Company, Dubuque.
- Standard Telephone Company, Dubuque.
- Linn County Telephone & Telegraph Company, Marion.
- Shell Rock Valley Telephone Company, Rockford.
- Vinton & Benton County Telephone Company, Vinton.
- Cedar Valley Telephone Company, Waterloo.
- Bellevue Telephone Company, Bellevue.
- Cedar Rapids & Marion Telephone Company, Cedar Rapids.
- Marshall Telephone Company, Marshalltown.
- Wettstein Telephone Construction Company, La Porte City.
- West Liberty Telephone Exchange, West Liberty.
- United States Telephone Company, Waterloo.
- Delaware County Telephone Company, Manchester.

TROUBLE AT WABASH, IND., FOR BELL CO.

THE Bell Telephone Company at Wabash, Ind., and the city council are unable to agree upon the kind of franchise the company should be granted to continue the service. A special meeting of the council was held last week, and Attorney Mann, the legal representative of the company, was present and made a statement concerning the wishes of the company. The history of the affair is quite interesting. The Bell Company has been operating in the city without a franchise since last May. It was taken for granted that the company would ask for a franchise when the old one expired, but this was not done. In July the city council demanded that the company secure a franchise or

cease to do business in Wabash. A continuance of the matter was secured until September. The company took no action then, and the council passed an order that the company must either secure a franchise by October 1 or remove all poles and wires from the streets. The question of a franchise was then referred to a committee, the company having expressed a willingness to secure a right to continue its business in Wabash. The committee drew up a franchise identical in its restrictions and privileges with that of the Home Telephone Company, and the company was given until February 1 to accept it. Attorney Mann visited the city again, and said the Central Union Company objected to two features of the franchise. One of these was the time limit of ten instead of twenty-five years. The other was the rate. The council refused to permit more than \$1.50 a month either in the residence or business houses. The company insisted on the same rates as charged in other cities the size of Wabash. Thereupon the council instructed the company that it had no franchise, and must get one or remove all property; that it will be given no favors and no handicaps not given the Home Company; that the council would give the company until the last meeting night in February for a final acceptance or refusal of the franchise.

A COMBINED TOLL STATEMENT AND RECEIPT.

By WILLIAM ELGES.

LATELY the Lewis County Telephone Company, Canton, Mo., has adopted a new method of handling its toll statements. The front and reverse sides of a statement, similar to the one in use by this company, are shown in the accompanying drawing. The statement is provided with a blank for the date, name of subscriber and the number of his telephone. The receipt has a blank for the totals and when the bill is paid. The blank space after *Received Payment* is filled in after collection with the proper figures, and this serves as a receipt. The stub is kept by the

Feb. 1, 1904		HOMETOWN, MO. Feb. 1, 1904	
To J. B. Smith		Mr. J. B. Smith	
\$1.00		TO HOME TELEPHONE COMPANY, DR.	
TOLLS 2 @ 1.30		FOR USE OF 1 TELEPHONE FOR MONTH OF Feb. 1904 \$1.00	
ALL TELEPHONE FOR		TOLLS FOR MONTH OF Jan. 1904 \$1.30	
MONTH OF Feb. 1904		TOTAL \$2.30	
		RECEIVED PAYMENT OF \$2.30 \$2.30 COLLECTOR	

company. On the reverse side of the blank a space is provided for an itemized account of the toll calls. The company has found this method a valuable one in collecting.

PUPIN'S PATENT SUSTAINED IN GERMANY.

CABLE dispatches from Professor Michael I. Pupin, of Columbia University, who is now in Berlin, announce complete victory over the German postal administration and others on his German patent for his invention of long distance and ocean telephony. This is the invention covered by United States patents issued to him on June 19, 1900, and sold to the American Bell Telephone Company for a large sum of money. Professor Pupin disposed of his European rights to Messrs. Siemens & Halske, of Berlin, contingent on his success in securing his patent from the German Patent Office. His German application has been pending for four years, and its grant has been hotly contested by the German postal administration and several strong private concerns. Professor Pupin has twice gone abroad on account of this contest.

TRI-STATE SHOWS UP WELL.

THE statement of Robert E. Umbel, the president of the Tri-State Telephone Company, which operates principally in Pennsylvania, to the stockholders of the company, shows most satisfactory results since the organization of the company in 1897. The company now owns 19 miles of cable, 1,400 miles of wire, 140 miles of pole line, and over 1,500 telephones in actual service. Shortly after its organization the company established exchanges in many of the smaller places in the vicinity of Uniontown. An entirely new line has been built from Uniontown to

Fairchance, to Smithfield, Outcrop, Gans, and to near Cheat Haven, with exchanges at all of those places. Through the Waynesburg company the Tri-State has connection to Wheeling and Fairmount, while service will be secured with the Somerset County Telephone Company and the Johnstown and Cumberland Independent companies, which will add from 8,000 to 10,000 telephones to the Tri-State service. Arrangements were made for entrance into Pittsburgh by a connection with the Pittsburgh & Allegheny Telephone Company, but they entailed the building of a line 50 miles long from Vanderbilt. The Tri-State will build 30 miles and the Pittsburgh & Allegheny 20, and a field with from 25,000 to 30,000 subscribers will be added. There are few towns in Fayette County to which the lines do not extend, while many points in West Virginia and Maryland are also touched.

MICHIGAN INDEPENDENT ASSOCIATION ANNOUNCEMENT, GRAND RAPIDS, FEB. 24-25.

ANNOUNCEMENT has been made of the program of the annual meeting of the Michigan Independent Telephone Association, which will be held in Grand Rapids, Mich., on February 24 and 25, and is as follows:

WEDNESDAY, FEBRUARY 24.

10:00 a. m.—"An Automatic Exchange," by the Exchange Itself.

2:00 p. m.—Address of Welcome, by Mayor W. M. Palmer.

President's Address, by E. B. Fisher, Grand Rapids.
"Our Experience with Farm Telephones," Dr. G. S. Root, Hart, Michigan.

Discussion.

"Old and New Ideas on State Clearing Houses," R. F. Johnson, Saginaw, Michigan.

Discussion.

"A County System, Including Rural Telephone Service," W. O. Hunt, Adrian, Michigan.

DATE	MESSAGE TO	AT	REGR	RESD	TRANS	TOTAL	
Jan. 2	W. B. Smith	St. Louis	10	75	35	1.20	Jan. 31, 1904
Jan. 14	W. B. Smith	St. Louis	10	75	35	1.20	
							NO. OF MESSAGES 2
							1.30
							TOTAL \$1.30

Discussion.

"Our Needs in Southeastern Michigan," R. B. McPherson, Howell, Michigan.

Discussion.

7:30 p. m.—"Telephone Accountants," W. J. Melcher, Alma, Michigan.

Discussion.

THURSDAY, FEBRUARY 25.

9:00 a. m.—"Rural Developments in Jackson County," N. F. Wing, Jackson, Michigan.

Discussion.

"Is the Time Right for Three Minute Service?" C. E. Tarte, Grand Rapids, Michigan.

Discussion.

"A City's Relation with Rural Lines," H. A. Douglass, Jackson, Michigan.

Discussion.

"National Situation of Independent Telephone Companies," J. B. Ware, Grand Rapids, Mich.

Discussion.

"What We Are Doing in Washtenaw County," Chas. F. Speed, Ann Arbor, Michigan.

Discussion.

Election of Officers.

At a meeting of the executive council of the association at Grand Rapids, February 4, it was decided to admit manufacturers and dealers of telephone equipments as associate members to the association on the payment of \$5.00 dues per year.



CAN IT POSSIBLY BE SARCASM?

OUR esteemed contemporary, the *Boston Journal*, ought to send a representative through the Western States to come in direct contact with Independent telephony in action, before opening its columns to such a ridiculous series of mis-statements as those which appeared in the issue of February 6. In an article regarding the American Telephone & Telegraph Company's stock, inspired by a "prominent Boston broker who is conversant with American Telephone & Telegraph affairs," the journal says with great gravity:

"There is a great deal of talk about the competition by Independent companies. In the East this is seen very little. In the West there are many small companies operating under other than the Bell patents. For the most part these are purely local in character and cover districts where the American Telephone and Telegraph Company would not feel that it was profitable to extend its lines. These local companies furnish communication between the residences of limited districts. Over longer districts they become feeders of the American Telephone & Telegraph Company. Officials of the latter say that they are not at all disturbed over this kind of competition, and that the company is doing better to-day than ever before."

It is difficult to read this surprising statement without laughing and one feels inclined to doubt the seriousness of the writer. Surely he must be indulging in sarcasm. But, no, the article is written in great gravity and, moreover, quotes such high authority as the aforesaid prominent Boston broker, who knows all about Bell affairs. The *Journal* has a long record for conservatism and may not know the enormity of its offense but the broker in question, if he knows anything about the telephone situation, must have laughed in his sleeve and held his sides in silent mirth.

Of course, the statement was inspired for financial purposes and was intended to hoodwink the stockholders of the American Telephone and Telegraph Company, preparatory to asking them for more money as Boston is the financial headquarters of the Bell interests. Boston has in the past absorbed the unearned millions of the Bell monopoly and to Boston must this once great monopoly look for sustenance in the hour of its decadence. If Bell stockholders and investors generally were fully alive to the actual condition of affairs and thoroughly acquainted with the extent and prominence of the Independent movement, which the officials affect to despise, they would hesitate before putting up more money and this money is very necessary to place certain portions of the Bell system on a competitive basis. It seems a pity to awaken these stockholders from their dream of bliss.

"In the West there are many small companies operating under other than Bell patents," says the *Journal*. That is quite an admission, coming as it does, from a Bell source. It differs from most of the inspired statements that originate in Boston relative to Independent telephony, in that there is a measure of truth in it. It is undoubtedly true that there are many such companies. "Many" may not be a very enthusiastic adjective, with which to describe seven thousand companies, but strictly speaking, it is correct. Seven thousand companies are certainly "many," even when seen from the great altitude of a Bell official. That is the number of Independent companies there are in the United States. The paper omits to state that many of these are large companies while mentioning the fact that many are small, but this may have been an oversight.

MORE NEWS ITEMS FROM BOSTON.

It would hardly do for a Boston paper to inform the Bell stockholders of the exact number of companies in the West which are operating under other than Bell patents. Much less would it be

wise to open their eyes to the significant fact that there are more Independent telephones in use in the country than there are Bell. It might give the stockholders financial colic and then what would become of some of those western Bell companies who are depending on financial assistance from the parent concern to enable them to get on a competitive basis with the despised Independents?

These seven thousand companies, according to the *Journal*, cover limited districts, "where the American Telephone and Telegraph Company would not feel that it was profitable to extend its lines." The American Telephone and Telegraph Company must be in its second childhood or else grossly maligned, for these limited and unprofitable districts which the Independents are operating to the practical exclusion of the Bell people are the great States of Ohio, Indiana, Michigan, Iowa, Kansas, and similar unimportant districts. A little competition like that does not worry the Bell officials any, although you could lose the whole State of Massachusetts, Boston included, with all of its undeniable greatness, in any one of these limited districts. At the rate in which this competition is progressing, a good share of Illinois will soon have to be added to the Bell's "unprofitable" list.

Inspired articles like that in the *Journal* are designed to throw dust in the eyes of Bell investors. They do the Independent no direct harm. But they serve to emphasize the underhand methods which are so characteristic of the Bell people. Here is a statement which every Independent operator knows is not true, but there will be other statements, on the face of which the falsehood will not be so apparent, and which may deceive the unwary. The best way is to discredit everything which proceeds from a Bell source, whether it is an inspired article in the press or a manufacturer which poses as an Independent while being owned and controlled absolutely by Bell people. Independent telephone companies cannot afford to help build up a Bell concern like the Kellogg. They have too much at stake to lend aid and comfort to the enemy.

MR. FOWLE'S TRANSPOSITION PAPER.

THERE has always been a conspicuous lack in telephone literature of descriptions of definite methods of planning transposition. There have been special rules given and diagrams printed which would apply in some particular instances, but as to good, hard, generally applicable rules, there have been none. Mr. Fowle's paper, which commences in this issue, upon cross talk and induction in the telephone lines is one of the ablest contributions to electrical literature that has recently appeared. To detect injury to service due to effects is one of the easiest problems in telephony; to prescribe a remedy, one of the most difficult. Mr. Fowle commences his paper with a mathematical investigation of the relations between the perturbed and perturbing. While, naturally, this is dry reading, and to many may appear superfluous and to some possibly incomprehensible, yet it forms the basis of the only possible basis of a very complete transcription for arranging lines, to remedy cross talk and induction, and one which if carefully studied and conscientiously and thoroughly applied will be found of great value.



Conducted by *A. H. McMillan*

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

FAILURE TO GUARD AGAINST LIGHTNING.

SUIT has been commenced against us to recover \$10,000 alleged damages on account of a barn burning September 26, 1903, which had a guy wire attached to it running from one of our poles. The barn was on the opposite side of the road from the house at the end of a short spur off the main line, the plaintiff was the only subscriber on this spur. It is claimed that during an electric storm lightning struck our line somewhere between town and the plaintiff's barn, a distance of three and a half miles, and followed the line to this last pole, then jumped from the line to said guy wire and set said barn on fire. What do you think of the case?

L. TELEPHONE CO.

THE circumstances set up by the plaintiff appear very unlikely, and we think a jury ought to be easily convinced that the company was not to blame. There is, moreover, a rule of law that you can invoke in your favor. An action for negligence cannot be maintained where it was improbable that damage would result from the defendant's act. A failure to guard against an intervention of natural forces which could not have been reasonably foreseen does not create liability, either because there is no negligence in such a failure or because it is not to be regarded as the proximate cause of the damage. *Ward vs. Atlantic, etc., Co.*, 71 N. Y., 81; *Denny vs. N. Y. Central R. R.*, 13 Gray (Mass.), 48. This rule has been applied very recently to a case similar to your own. The defendant, an electric lighting company, allowed the insulation on its wires to become worn where they entered the plaintiff's house. A fire started at that place during a thunderstorm and destroyed the house. An instruction by the trial court that the company was under a duty to insulate its wires against lightning was held to be erroneous. *Phoenix, etc., Co. vs. Bennet*, 74 Pac. 48 (Ariz.). See also 17 Harv. L. Rev., 281.

TWO ENGLISH TELEPHONE DECISIONS.

THE case of the National Telephone Company vs. Samuel, in the Divisional Court of the High Courts, was an appeal of the company against a decision of the deputy judge of the Marylebone County Court. The action was brought by the company against a subscriber to recover one year's rent of a telephone, due in January, 1903, under a written agreement. The contract was made January 3, 1900, and was to extend for five years. It was provided that the company should maintain the telephone and line in good working order. For the first two years of the term all went well and defendant paid his subscription. When 1903 came around he refused to pay and the company commenced suit. The defense was that the telephone instrument and line were not maintained by the company in good working order, as agreed. Defendant therefore claimed that he had received no consideration for the agreement, and as the company had failed to perform its part he asked that the contract might be rescinded. Counsel for the company said it had not been shown that there was a total failure of the service, and the county court judge was not justified in holding that there was a defense to the company's claim for rent, and that the contract should be rescinded. Defendant contended that unless he was entitled to the remedy that the county court judge gave him he had no remedy at all, and must go on paying for this machine, which was a total failure, for the last six weeks of 1902.

The court said he had come to the conclusion that the appeal must be dismissed. He did not think any jury would hesitate to find that such a service as this, which it had been admitted had to be remedied over and over again in 1902, and at length broke down in November, so that it was no use attempting to use it further, showed that the company did not intend to perform its

part of the bargain and to give a reasonably efficient service. There could be no doubt that the company was bound to do that, and if what it performed was the best, all he could say was that electrical and mechanical science must have made very little progress in this country. The court held the trial judge right in rescinding the contract and dismissed the appeal.

The other English case was an action brought in Haverfordwest County Court by the same telephone company, the National, against four business men of Haverfordwest for non-payment of four years' rent of telephones. The wires had been laid under an agreement by which the defendants were to have the benefit of communication with all subscribers in the Pembrokeshire Exchange area for their fixed subscription. The defendants alleged that it was represented to them by plaintiff's agent that subscribers would be secured in the other towns in the southern part of the country, and those towns connected up as the exchange area referred to. This, however, was not done. Plaintiffs denied liability to do anything of the sort, and contended that their obligations ceased when they had connected all the Haverfordwest subscribers by means of the local exchange, and then connected that exchange to the main trunk line. The court held that any representations as alleged by defendants were no part of the contract, and that the latter had been fulfilled by the plaintiffs, for whom he gave a verdict.

NO RIGHT OF EMINENT DOMAIN.

THE Superior Court of Pennsylvania, in the case of the Pennsylvania Telephone Company vs. Hoover, appealed from the Dauphin County Court of Common Pleas, has declared that a telephone company does not acquire the right of eminent domain under the act of April 29, 1874, to enter upon private lands for the erection of its lines. The lower court had granted and made permanent a preliminary injunction against Hoover, prohibiting him from interfering with the construction of lines of the company, which, instead of following the highway, had cut across his farm after an indemnity bond had been filed to secure him from damage.

In the opinion it is clearly set forth that the owner of a farm through and over which a public highway has been laid and opened under the right of eminent domain, is as much the owner of the land occupied by the highway as he was before it was laid out, and is entitled to damages for the erection of telephone poles upon the road on which his land abuts. The opinion continues to the effect that telephone lines are to be classed as telegraph lines under the interpretation of the act, but the additional servitude cannot be imposed without the consent of the land owners and without just compensation. The court says:

"Not only is there no express grant of eminent domain but it is not conferred, so that telegraph companies are not constituted agents of the State to exercise that right upon private lands by necessary implication. It is singular that the statute under consideration has been the law thirty years without the assertion of the existence of the extraordinary power now claimed under it."

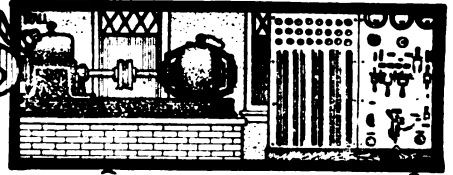
The opinion adds that the courts have no right to impose limitations; this right belongs to the legislature alone, which is the granting power, and concludes in this language:

"The legislature did not intend, under the provisions of the act of Assembly under which the plaintiff claims to exercise the right of eminent domain, to confer the extraordinary and supreme power upon it, except as is clearly indicated in the act itself, and this does not extend to the private lands of individual owners."

The case is attracting much interest in the locality where tried.

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.



A SIDE TONE REDUCER.—(284.)

On page 50 of your issue of July 23 you give a very concise explanation of the working of a condenser in a common battery sub-station set. I would be greatly indebted to you for a similar explanation of how the side tone is reduced in patent No. 732,795 on page 60 of the same issue. S. H. L.

In Fig. 284a we show the way in which common battery circuits are frequently wired, from which it is easy to see that the transmitter, condenser, one winding of the induction coil and receiver

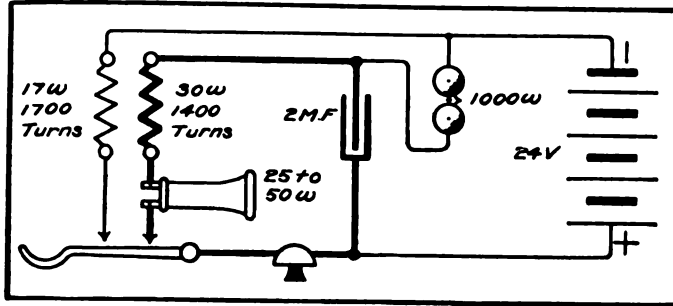


Figure 284a.

are in series in the local circuit when the switchhook is raised, while the other winding of the induction coil is in the line. Under these circumstances, if the transmitter is powerful and sensitive it will pick up all local noise which will be repeated in the receiver and appear as a disagreeable side tone. At Fig. 284b we show a diagram upon the same plan, illustrating the method in the patent to which you refer. Here it is seen that the transmitter and one winding of the induction coil are placed across the line, while the receiver, the other winding of the coil and the condenser are in series in a local circuit. Thus the transmitter is removed from the local circuit and thereby the side tone is said to be very much modified.

ANOTHER OHMMETER QUESTION.—(285.)

As I understand it, if there is a difference of potential between B and D, in the ohmmeter circuit shown in Fig. 285a, a portion of the current will flow through the receiver, and if B and D are of the same potential there will be

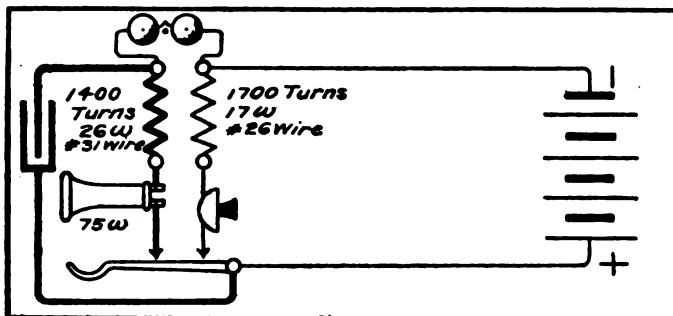


Figure 284b.

no current flowing through the receiver; therefore, A D and A B must be of the same resistance. In the example given A B has a resistance of 150 ohms, and supposing A C to have a resistance of 10 ohms, A B would measure 6 ohms. Then B C would be 100 ohms and D C would be 4 ohms. Kindly explain how a balance is obtained under the above conditions.

R. L. D.

The ohmmeter differs in no wise from a Wheatstone bridge, excepting that in the ordinary arrangement of the Wheatstone bridge a series of resistance coils are provided which can be followed step by step, while in the ohmmeter a wire of uniform resistance is used which forms the two arms of the bridge as the contact point is moved along, the wires which divides it into two segments, which are proportional to the resistance in the other two arms. The theory of the Wheatstone bridge is best understood by reference to diagram in Fig. 285b, in which E is a battery joined by two conductors, F, G, and K, L to the points A and D. Between A and D there are two circuits, one A B D

and the other A C D. Now it is evident that if the conductors E F G A and E K L D have immeasurably small resistance the potential of the battery E will be applied to the joints A and D, and that current can flow from A, and that, therefore, between A B D and A C D there is a fall of potential due to the resistance of these two circuits. Suppose the conductor A B D

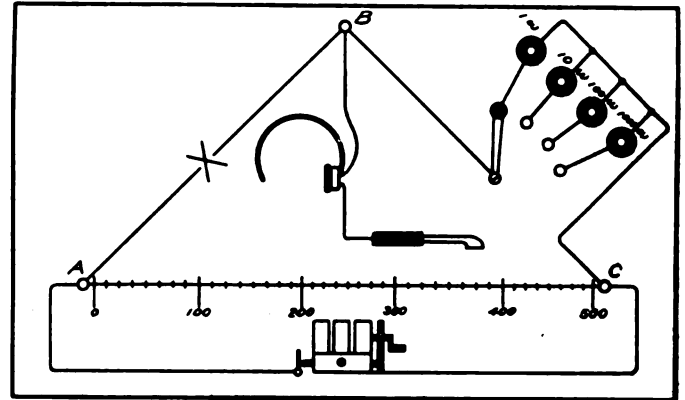


Figure 285a.

to be divided into two parts, of which the resistances are respectively R' and R'' , and suppose the conductor A C D to be also divided into two parts of which the resistances are R^3 and R^4 . Then, since the fall of potential between A and D along the conductor A B D is the same as between A and D, along the conductor A C D, there will be some point C on the conductor A C D, which is at exactly the same potential as any given point B on the conductor A B D. Now, if these points are joined by a galvanometer, telephone or other current indicator, no current will be found to flow because both points are at the same potential. Under these circumstances, the following relation holds true, $R' : R'' : : R^3 : R^4$. For let I' be a current through R' , it will also be a current through R^3 , since no current flows between the points B and C. Let I'' be the current through R'' also, this

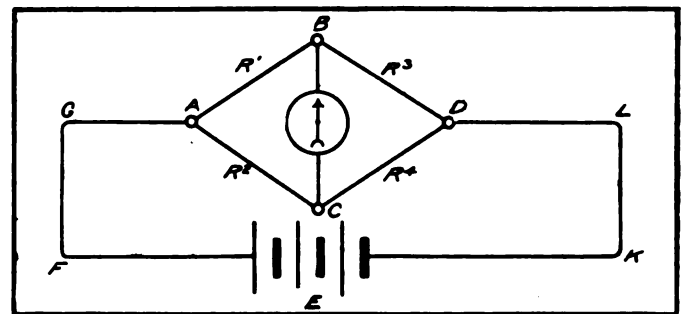


Figure 285b.

is the current through R^4 because no current flows between C and B. Then, since the potential between A and B is the same as between A and C, we have

$$R' I' = R^3 I', \text{ also } R'' I'' = R^4 I''$$

Dividing the first of these equations by the second, we have:

$$\frac{R' I'}{R'' I''} = \frac{R^3 I'}{R^4 I''}$$

This can be written as a proportion, $R' : R'' : : R^3 : R^4$.

WILL WEATHERPROOFING PREVENT INDUCTION.—(286.)

I would like to know if the use of weatherproofed No. 14 iron wire will prevent induction when a telephone line is parallel to an electric power lead. P. T.

No. The use of weatherproofed wire is not apt to help matters any.

TREE GROUNDS AND HOW TO CLEAR THEM.

F. R. PINE.

EVERY "trouble-shooter" well knows that a tree-ground is an exceedingly mean piece of trouble to locate. On ordinary general-system service a subscriber's line, or trunk wire, can stand quite a leak of this kind, but where a system of incoming and outgoing trunk lines are used, and their signals are operated by battery impulses from a distant office, a ground of even two volts added to a possible difference in ground-potential between the offices will result in bringing up the lamp signals and otherwise interrupting traffic. On circuits that are being worked "composite," or are duplexed for "phantom" trunks, the least ground will disturb the balance of the lines and make them too noisy for use.

Covered wire cannot be relied on for insulation from tree-

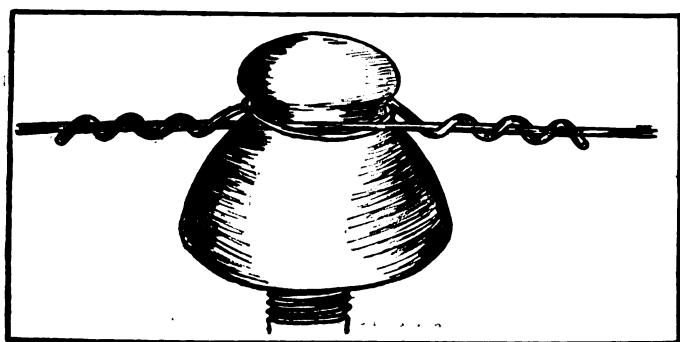


Figure 1.

grounds. The friction of the insulation on the bark will in time cause sap to flow from the abrasion, and the sap will eat into the covering of the wire and attack the metal itself. This is particularly true of oak and maple trees, and will result in a ground of between three and four volts, using twenty-four volts on the testing-table voltmeter. A nail in a tree will cause a ground of about five volts, and a guy-wire wrapped on the bare bark of a tree and uninsulated in its length will cause an eight-volt ground under the same testing conditions. These results are of course not infallible, but where there is any difference in ground potential between the offices they will be found to be approximately correct.

Placing brackets in trees should be discouraged. There are instances where they have been discouraged by means of a gun in the hands of a wrathful property owner, and with good reason, for they mar and disfigure a tree. When their usage is allowable the wire should be attached to the side of the glass away from the tree, or limb, so the breaking of the tie-wire will not allow the line-wire to fall in between the bracket and the bark, or to lie on the nail of the bracket. A "gooseneck" or "figure 8" tie are poor ones to use, as the swaying of the limb and bracket will punish the wire. A good tie for the purpose, shown in Fig. 1, is made by laying the middle of the tie-wire against the line-wire in the groove, and taking the ends back around the glass in opposite directions—one under and one over the line-wire—and making

up in the usual way for a "square tie," as is used on heavy iron wire.

But the best way is to split a porcelain knob down its center, as shown in Fig. 2, and put it together with the line-wire through the screw hole. A piece of marlin or okinite jumper wire can be wrapped around the groove of the knob to hold the two halves together, and the other end of the marlin fastened to some large limb with tension enough to pull the line-wire away from the source of trouble. The knob should be secured to the line-wire by means of a square tie, to prevent it from sliding out on the wire.

The knob can be very easily split by means of a screwdriver being driven into the hole with a pair of pliers, as shown in Fig. 2. Use a screwdriver that has a slightly larger blade than the

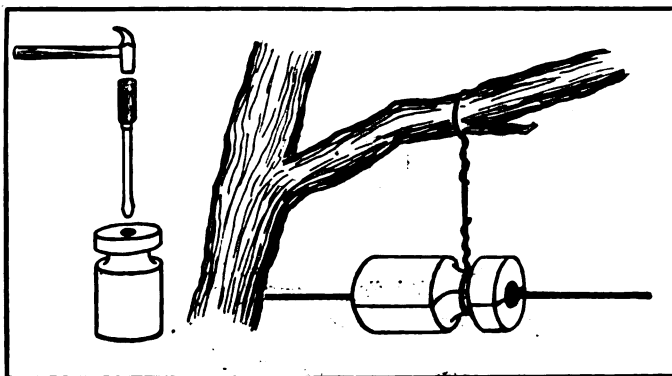


Figure 2.

hole in the knob, and tap it firmly until the knob separates. A little practice will enable it to be done without otherwise fracturing the knob.

When the line wire is laying against the outer side of the tree and no bracket is allowable, and there is no means of using the method of insulation just suggested, another method of insulation can be adopted. This consists of wrapping the line wire with a heavy layer of tape, and then taking a section of bamboo fishing pole split down the center, and encasing the wire with this wooden tube. A couple of layers of tape are then wrapped around the tube, holding the two halves of the tube to the wire, and further protecting it. Without the light wooden casing the sap would permeate the tape and attack the metal, but this will effectually prevent it from so doing. A piece of garden hose will answer the same purpose, but it is very heavy. The methods of insulating described in this paragraph are emergency temporary methods and should only be used where conditions will not admit of a repair to be made of a more permanent and better type.

It is well to remember that anchor guys will sometimes lift in freezing weather, especially if planted in marshy soil, and the far-sighted trouble-man will see that all line wires that might become grounded by the tightening of the slack in a grounded guy are heavily wrapped with tape at the point whereby contact might occur.

CONDITIONS OF COMPETITION AT NEVADA, IA.

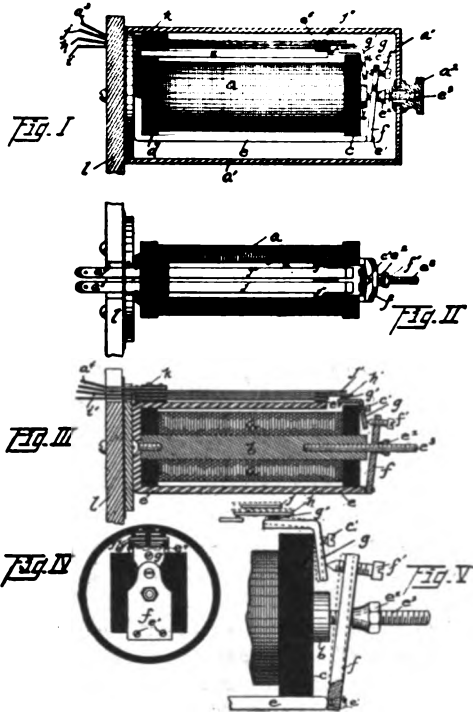
When the Nevada Mutual Telephone Company, of Nevada, Iowa, started operation in the spring of 1899 the Bell Company had an exchange of about sixty lines, the bulk of them being those serving business houses, as it seemed to be the company's wish to get only such subscribers as would use the toll lines considerably. As a result of this the company did not grow or try to grow, and it was an easy matter for the Home Company to take all their subscribers, which they did in about two months after they opened, at which time the Bell notified their few remaining subscribers that they would go out of business. They had during this time of course cut their rates to almost nothing in an effort

to keep up, but without getting a subscriber. A little over three years after the local company started, and when it had about 250 subscribers, it was decided that a raise of rates was necessary in order to better the quality of the service and to make needed improvements. Accordingly all patrons were given sixty days' notice that the rates would be raised from \$1.50 and \$1 to \$2 and \$1.25 per month. The company lost about twenty-five telephones, and immediately the Bell was on hand trying to get a new hold. The local concern pulled through, however, with the raise. The Bell at this writing is in Nevada again with its solicitors, and will doubtless follow in its past unsuccessful footsteps.

PATENTS ISSUED

IMPROVED TELEPHONE RELAY.

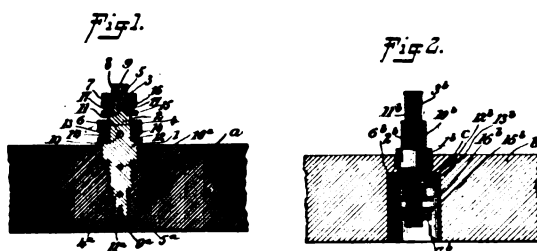
J. P. Downs, Cleveland, Ohio, patents (No. 749,814) and assigns to the North Electric Company, of Cleveland, an improved telephone relay. The object of this device is to provide a relay which



is simple and economical of manufacture and reliable and certain of manipulation. It is illustrated in Figures 1, 2, 3 and 4, in which there is a core, 6, upon which is placed a winding, a, in the usual manner. Around the core is a polar extension, E, running from the rear to the front of the relay. On the end of this extension the armature F is pivoted by a pin, E'. This armature presses against the knee lever G by means of an adjusting screw, F. The knee lever operates the springs E³ and E⁴, which carry the relay contacts. The whole is enclosed in the iron case A.

IMPROVED BINDING POST.

L. Steinberger, New York, N. Y., patents (No. 750,723) an improved binding post. The object of this invention is to produce a binding post which is strong and effective, easily manufactured and provides secure contacts for electrical circuits. This

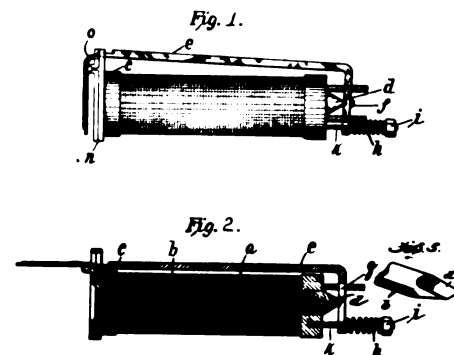


invention is illustrated in Figs. 1 and 2. Fig 1 shows the binding post complete, embedded in a composite insulation, while Fig. 2 shows it attached to a base bar or other similar device. The inventor provides a shank, 1, upon which there are two threaded portions, 2 and 3, provided as threads 4 and 5. Around each thread there is a revolvable nut provided with washers whereby the circuit wires may be clamped. As each end of the cylindrical

portion 1 is similar the binding post may be inverted at pleasure. Also the portions 2 and 3 have holders therein, into which circuit wires may be introduced.

IMPROVED TELEPHONE SIGNAL.

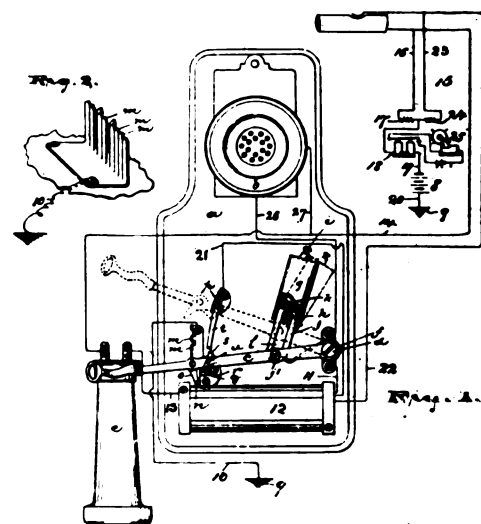
Lambert Schmidt, of Weehawken, New Jersey, patents (No. 750,309) an improved drop. The object of this invention is to provide a signal which is more sensitive and more reliable than those in use. It is shown in Fig. 2. The inventor provides a coil (b), one end of which is chamfered to a knife edge. Upon



this core winding (a) is placed. The forward end carries the iron head (c), upon which is pivoted a shutter. Over the shutter, supported by the pin (g) and balanced against the knife edge (d) is the lever (e), balanced by means of the spring (h). When the coil is excited the lever (e) is attracted by the head (c) and raises the shutter.

TELEPHONE CALLING INSTRUMENT.

J. D. Peachey, East Orange, N. J., patents (No. 751,103) an improved instrument for making and registering telephone calls. The object of this invention is to simplify the construction and arrangement of instruments for registering telephone calls to

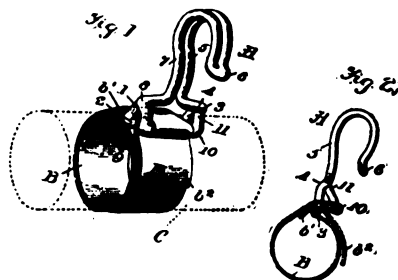


secure greater compactness, and to enable the device to be employed in either series or bridging circuits. This invention is shown in the figure, in which the diagram in the upper left-hand corner represents the central office, at which there is a magnet, 18, and common battery, 8. In the diagram of the substation instrument it will be seen that the hook lever C is attached to a dash-pot g by means of a link j. The hook also carries the lever t. Upon

the backboard a comb is placed, which is shown in detail in Fig. 2. This comb is mounted and the teeth may be bent in such a manner that as the lever *t* sweeps over the comb it transmits to the central office as many impulses as there are teeth. By this means the registering device at the central office is actuated and the subscriber's number may be printed on a slip of paper or displayed on a dial.

IMPROVED CABLE HANGER.

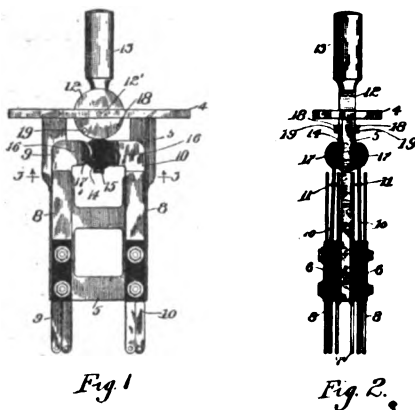
R. H. Villard, New York, N. Y., and H. P. Copeland, Jersey City, N. J., patents (No. 751,228) an improved cable hanger. The object of this invention is to produce a cable hanger for suspending electrical cables in a more secure and substantial manner than is



now in existence. The device is shown in Figs. 1 and 2. This invention consists of a hook, *A*, and a sheet of zinc forming a strap, *B*. The hook is formed to comprise a grip, and is made of a single piece of straight wire which, starting at *1*, is bent at *2*, led straight to *3*, then bent to *4*, and forms the hook at *5*, *6* and *7*, being bent downward again at *8*, from *8* to *9* passing to *10* and terminating at *11*. Thus the parallel members *1* to *2* form a grip which locks the strap to the cable.

IMPROVED SWITCHBOARD KEY.

J. S. Goldberg, Chicago, Ill., patents (No. 750,845) and assigns to the Stromberg-Carlson Telephone Manufacturing Company an improved ringing and listening key. The object of this invention is to provide an efficient and reliable key, economical to construct, easy to maintain and to occupy a small space on the switchboard shelf. This invention is shown in Figs. 1 and 2, Fig. 1 being a side elevation and Fig. 2 an end elevation. The inventor provides

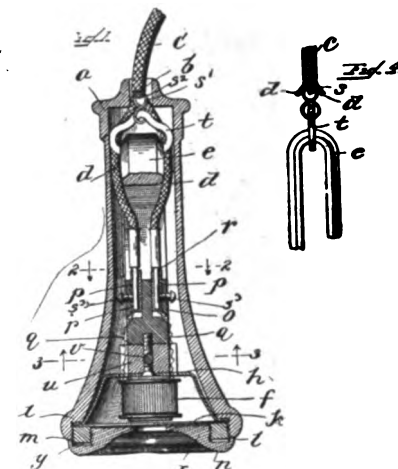


an escutcheon plate *4*, to which the handle *13*, carrying a disc, *12*, is pivoted by the pivot *12'*. The lower part of this handle carries a rubber wedge, which manipulates the springs *17*, which carry two contacts, *11*. The rubber wedge is so chamfered that when the key is pushed to the ringing position it will be automatically ejected by the springs and returned to normal while pushing a listening position will remain set until released by the operator.

IMPROVED TELEPHONE RECEIVER.

L. Sands and C. C. Cadden, Cleveland, Ohio, patent (No. 751,344) an improved telephone receiver and assigns to the Williams-Abbott Electric Company. The object of this invention is to provide a telephone receiver having an improved method of securing a diaphragm and ear piece and a better means of attaching the terminals of the line conductors. This invention is illustrated in Figs. 1 and 4, Fig. 1 being a section and Fig. 4 a detail. The inventors provide the usual case *A*, which is furnished with a seat *I*. The magnetic system, consisting of the permanent

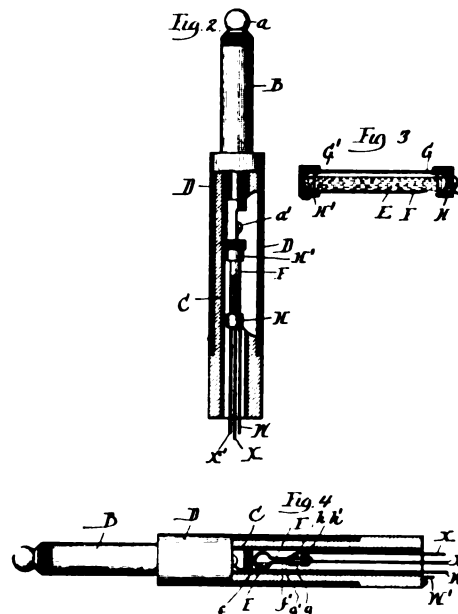
magnet *E*, is provided with a metal cup *H*, which is dished to bear upon the seat *I* and to secure it at the ring *M*, the ear piece being threaded and screwed inside of this ring. The ends of the electromagnet *F* are carried to the terminals *P*, which are furnished with screws *S3*, whereby the terminal points of the receiver cord *P* are secured to the magnetic system. The cord *C*



is furnished with a sleeve *B*, which is attached to a coil ring *7*, Fig. 4. This ring is passed around the permanent magnet and thus the terminals are completely relieved from the weight of the receiver.

PLUG SWITCH FOR TELEPHONE SWITCHBOARDS.

Frank D. Pearne, Chicago, Illinois, patents (No. 750,689) and assigns to Pearne, Kruse & Co., Chicago, an improved plug for telephone switchboards. The object of this invention is to provide a combination of plug and switch which will avoid the necessity of an ordinary relay or other switching device in common battery switchboards for restoring a supervisory signal. This invention is shown in Figs. 2, 3, 4; Fig. 2 being a section; Fig. 3, a detail, and Fig. 4, a sectional detail. From Fig. 2 it will be per-



ceived that the plug is constructed in the usual manner, having two conductors, one terminating in the tip (*a*) and the other in the sleeve of (*B*). The peculiarity lies in the insertion of the device shown in Fig. 3, between the end of the tip (*a*) and the conductor (*x*) attached thereto. This device is an insulating tube (*F*) to which one end of the tip (*a*) is connected metallically and the conductor (*x*) metallically to the other end. The tube is partially filled with a conducting fluid, like mercury. When the plug is vertical on the cord shelf, the fluid settles to the bottom of the tube and opens the circuit. When it is inserted in a jack and is horizontal the mercury connects both ends of the tip conductor and completes the circuit.



FINANCIAL.

HARRISONVILLE, ILL.—The Harrisonville Telephone Company has increased its capital stock from \$20,000 to \$30,000.

BINGHAMTON, N. Y.—A certificate has been filed in the county clerk's office stating that the Mount Erick Telephone Company has increased its capital stock from \$1,200 to \$5,000.

DAYTON, O.—The Home Telephone Company reduced its capital stock from \$750,000 to \$600,000 and then filed papers increasing the capital to \$1,000,000 in order to make all preferred stock at 5 per cent.

TIFFIN, O.—The Home Telephone Company, of this city, has been reorganized, with the capital stock increased to \$125,000. It will now be known as the Tiffin Home Telephone Company. The new officers elected are F. B. Myers, president; Kora F. Briggs, vice-president; James J. Kintz, treasurer; Edwin R. Strohm, secretary and superintendent.

EVANSVILLE, WIS.—The Evansville Telephone Exchange, by its president, A. S. Baker, and secretary, R. M. Richmond, has increased its capital stock to \$20,000.

WESTBY, WIS.—The Westby Telephone Exchange has declared a dividend of 25 per cent. The company has increased its capital stock from \$5,000 to \$10,000. H. O. Sterlingson, Andrews Lee and Lawrence Grinsrud have been elected directors.

FRANCHISES

LONDON, ONT., CANADA.—The Canadian Telephone and Telegraph Company has asked for a franchise in this city.

CEDAR FALLS, IA.—A franchise has been voted a telephone company projected by R. A. Davidson.

HARLIN, IA.—The council has decided to submit the question of granting a franchise to the Farmers' Mutual Telephone Company of Shelby County to a vote of the people.

MONROE, IA.—The Reasnor Telephone Company has been granted a franchise in this town.

BREWER, ME.—The Bangor Automatic Telephone Company has been granted a franchise here.

BIG TIMBER, MONT.—The Main and East Bowl Telephone Company, which is being established among the ranchmen in Bowl Valley, has asked for a franchise in this town.

BILLINGS, MONT.—The Moffitt Telephone Company has asked for a new franchise in this city for twenty years. The present franchise expires in four years.

WOODBINE, N. J.—The Eastern Telephone and Telegraph Company, of Camden, has been granted a franchise here.

HAMILTON, O.—The county commissioners have granted a franchise on the highways of Butler County to the Hamilton Home Telephone Company.

CHARLEROI, PA.—The Charleroi Telephone Company has applied for a franchise in this town.

COMBINATIONS

VINCENNES, IND.—The Home Telephone Company of this place is planning to extend lines to Illinois towns across the Wabash River.

BERTHA, MINN.—The H. & W. Telephone Company will construct a telephone line from here to Long Prairie and also short lines from several towns.

CHILLICOTHE, MO.—Business men here are planning to organize a new company to be known as the Chillicothe Gas, Electric Light & Telephone Company, which will purchase the local telephone exchange. The new company will probably be capitalized at \$75,000.

GUTHRIE, OKLA.—J. M. Noble, president and general manager of the Pioneer Telephone Company of this place, F. Long of Shawnee, president of the Long Distance Telephone Company; E. Westervelt, of Perry, treasurer of the Pioneer Company, and E. D. Nimms, of Muskogee, Ind. Ter., all directors of the North American Telephone & Telegraph Company, were in

Guthrie recently planning for a consolidation of the various companies. A new company will be incorporated, to be known as the Pioneer Telephone & Telegraph Company, with headquarters here, and a capital stock of \$3,000,000.

AMARILLO, N. M.—B. G. Stegman has sold the Amarillo Telephone Company and about 165 miles of toll lines to J. E. Nunn, of Shelbyville, Ky., for \$20,000.

COLUMBUS, OHIO.—The Federal Telephone Company has sold all interest in the Citizens' Telephone Company of Columbus to a syndicate headed by Cyrus Huling.

INDIANA, PA.—It is probable that the Indiana County Telephone Company and the Farmers' Telephone Company of Indiana County, will be consolidated. Fire recently destroyed the latter company's exchange, and they are now using the switchboard of the former company.

ANDERSON, TEXAS.—A. B. Foster, of Huntsville, has purchased the local telephone system.

UNDERGROUND

WORCESTER, MASS.—The New England Telephone & Telegraph Company is planning to put some more of its lines underground.

ELECTIONS

MOLINE, ILL.—The Union Telephone Company has elected N. Hamilton president; C. A. Lee, secretary; John W. Morrison, treasurer; E. P. Welch, cashier. Plans for addition to the present exchange are being considered, together with an extension to East Moline.

CONNEERSVILLE, IND.—The Connersville Telephone Company has elected George M. Sinks president; W. T. Edwards, vice-president; L. A. Frazer, secretary and treasurer.

MONROE CITY, IND.—The Wabash Home Telephone Company has elected F. C. Von Press, president; Dr. James M. Goldman, vice-president; E. P. Blann, secretary; James Bonenits, treasurer; F. M. Goodsell, manager. The capital stock of the company was increased from \$10,000 to \$25,000.

MUNCIE, IND.—The Delaware & Madison Counties Telephone Company has elected A. L. Johnson, of Muncie, president; J. J. Netterville, of Anderson, vice-president; J. C. Johnson, of Muncie, treasurer, and James Bromley, Muncie, secretary. A dividend of 3 per cent. was declared.

IOWA CITY, IA.—The Pleasant Valley Mutual Telephone Company has elected the following officers: J. E. McCollister, president; Phillip Reilly, vice-president; Lewis W. Miller, secretary; John A. Goetz, treasurer; Abe Plum, director, all of R. F. D. No. 5, Iowa City, Ia.

JEFFERSON, IA.—The Citizens' Mutual Telephone Company has elected Henry Haag president; Joseph Thompson, vice-president; J. A. Henderson, secretary; S. J. Sayers, treasurer; G. A. Wiggins, Benjamin Schilling, J. H. Elbert, R. G. Howard, J. E. Snodgrass, L. P. Blodgett, W. H. Smith and S. S. C. Culbertson, directors.

MAPLETON, IA.—The Maple Valley Telephone & Telegraph Company has elected W. H. Leathers, of Mapleton, president; J. C. Hammond, of Mapleton, vice-president; C. H. Smith, of Odebolt, secretary; T. B. Lutz, of Mapleton, treasurer. The other directors are Charles G. Cockerill, W. B. Booker and C. I. Whiting.

NORTH LIBERTY, IA.—The North Liberty Mutual Telephone Company of Johnson County has elected R. H. Wray, of Tiffin, president; A. L. Moorland, of Iowa City, vice-president; L. L. Stoner, of Iowa City, secretary; N. Zeller, of North Liberty, treasurer. R. H. Wray, Thomas E. Fountain, L. L. Stoner, Alex. L. Moorland and Samuel Linninger, directors.

OSCEOLA, IA.—The Murray & Lacelle Telephone Company has elected A. Luce, R. F. D. No. 3, Osceola, president; J. W. Miller, R. F. D. No. 2, Murray, vice-president; M. W. Luce and Daniel Sherwood, R. F. D. No. 3, Osceola, secretary and treasurer, respectively. Jacob Lindy, G. J. Coon and F. D. Hamm, directors.

TIPTON, IA.—The Davenport & Tipton Independent Telephone Company has elected H. R. Chapman, of Bennett, president; H. N. Meewes, of Tipton, vice-president and general manager; R. A. Nash, of Tipton, secretary and treasurer. The other directors are: J. H. Coult, of Tipton; F. B. Willex, of Mount Vernon; J. W. Heuer, of Dickson, and E. T. Jockheck, of New Liberty.

VAN WERT, IA.—The Van Wert Rural Telephone Company has elected F. L. Hall, president; J. F. Hocker, vice-president; H. O. Tuttle, secretary, and F. O. Stearns, treasurer. C. C. Waters, J. Ed. Fierce, W. F. Blair, of Van Wert, and J. F. Howell, J. F. Rumley, of Leon, directors.

LARNED, KANS.—The Ash Valley Mutual Telephone Company recently organized in Ash Valley Township for the purpose of building a line into Larned, has elected the following officers: F. B. Nichols, president; A. L. Scott, secretary; F. D. Nichols, J. G. Edwards, A. B. Lovett, E. Bartholomew, L. W. Krieger, J. W. Line and A. L. Scott, directors. A line will be built into Larned at once and connected to the Larned exchange, and the company's other lines will be put in an up-to-date condition.

BOWLING GREEN, KY.—The Home Telephone Company has elected Nerge Clark, president; E. B. Stout, first vice-president; J. W. Whitpotter, secretary and treasurer. The company has closed a contract to run a line to Scottsville.

ACTON, MINN.—The Acton Telephone Company has elected H. O. Halverson, president; John A. Sampson, vice-president; Even Evenson, secretary, and John G. Nelson, treasurer.

TRENTON, MO.—The Trenton Telephone Company has elected C. J. Bain, president; W. W. Bain, secretary and manager, and Henry Wettstein, treasurer.

MIDDLETOWN, N. Y.—The Orange & Sussex Independent Telephone Company has elected George G. Otis, of Newburgh, president; George F. Ketcham, of Warwick, vice-president; Mott C. Tuthill, of Washingtonville, secretary, and W. D. Haggerty, treasurer.

LINDSEY, WIS.—The Lindsey Telephone Company has elected P. N. Christenson, president; Henry Ebbe, secretary; Peter Paulson, treasurer. The company voted to install a new switchboard at Sherman's and make other improvements.

CANTON, OHIO.—The Starke County Telephone Company has elected F. S. Dickson, president; R. S. Shields, vice-president; R. W. Judd, treasurer; A. L. Hillhouse, secretary and general manager; Morton Furdue, general superintendent. Dr. J. P. Schilling, R. S. Shields, A. Dannemiller, F. Herbruck, F. S. Dickson, James B. Hoge, R. W. Judd, W. L. Cary, Jr., and C. Y. McVey, directors. Physicians have used the Starke County Telephone service exclusively for two years, and they recently passed a resolution to renew their agreement for five years to 1909. The company now has 3,786 subscribers, and fixed charges, interest, etc., paid and a very

satisfactory surplus at the end of the year 1903. Many extensions are planned for the coming year.

MARION, OHIO.—The Marion Telephone Company has elected F. F. Guthery, president; G. W. King, vice-president; O. Wollenweber, treasurer; D. M. O. Daffer, secretary and general manager.

MASSILLON, OHIO.—The Massillon Telephone Company has increased its capital stock from \$75,000 to \$150,000. The following officers are elected: Frederick S. Dickson, president; David S. Souers, vice-president; R. W. Judd, treasurer; W. S. Holloway, secretary.

NILES, OHIO.—The Warren & Niles Telephone Company has elected Washington Hyde president and treasurer, and J. J. McClean secretary. A dividend of 2 per cent. was declared.

SOMMERVILLE, PA.—The Sommerville Telephone Company has elected Dr. J. H. Brown, of Brookville, president; William Osborne, of Du Bois, vice-president; J. S. Hammond, of Reynoldsville, secretary, and D. L. Taylor, of Brookville, treasurer.

DOYLESTOWN, OHIO.—The Doylestown Telephone Company has elected W. A. Huffman president; A. W. Duley, vice-president; S. H. Miller, treasurer, and W. R. Miller, secretary.

MT. HOPE, WIS.—The Peoples' Telephone Company has elected William Leighton, president; Fred Wetmore, vice-president; Will L. Taylor, secretary and Albert Ketterer, treasurer.

PERSONAL

ALLEN B. SPAIN, manager of the Union Telephone Company, of Hazleton, Ind., has resigned and accepted a position as secretary and manager of the newly organized Home Company.

MISCELLANEOUS

PRINCETON, IND.—The Independent telephone service here is so much superior to the Bell that many Bell subscribers are having their telephones taken out and Independent telephones installed.

SOUTH BEND, IND.—Independent telephone men, representing over 10,000 Independent telephones, met at South Bend recently and held an enthusiastic meeting, discussing matters of mutual interest. Among those present were J. K. Johnson, Elkhart; S. V. Van Dusen, Michigan City; E. G. Stacey and J. N. Price, Benton Harbor; W. S. Daniel, Knox; A. B. Diggs, Winamac; Frank W. Brown and A. G. S. Chailiol, Wakarusa; C. R. Myers, Millersburg; M. I. Pancake, Dunlap; G. I. Briggs, Chicago; Theodore Thorward, South Bend; J. W. Scott, Warsaw; C. A. Reeve, Plymouth; R. C. Stephenson, Rochester; C. E. Koontz, Bremen; Claude R. Stoops, Nappanee.



New Construction in the Field



LOS ANGELES, CAL.—The Home Telephone Company will establish exchanges at Boyle Heights and East Los Angeles.

COLLINSVILLE, CONN.—The Farmington Valley Telephone Company added forty telephones to their list in this village during 1903, with more business in sight for 1904. They have a list of 130 telephones in town against the "Bell" 10, and this in Connecticut. This company has over 300 miles of wire.

WILMINGTON, DEL.—The Delmarvia Telephone Company will construct a new line to Hollow Oak.

BRADFORD, ILL.—The Milo-Bradford and Buda-Bradford Telephone companies have asked for a franchise here to construct local exchanges.

CUMBERLAND, IND.—The Cumberland Telephone Company organized about a year ago, with \$10,000 capital stock will construct a new exchange in Cumberland, and will extend lines through Warren Township. The officers are: William Gale, president; F. W. Wiese, secretary, and W. M. Coonfield, treasurer.

ELWOOD, IND.—It is probable that the Delaware & Madison Counties Telephone Company will increase its local exchange.

PETERSBURG, NEB.—The Cedar Telephone Company has made arrangements to connect with the Petersburg local exchange, and will construct a line from Elgin to this place.

SODUS, N. Y.—The Wayne & Monroe Telephone Company is planning to install exchanges at South Sodus, Alton, Sodus Point, Sodus Center, Wallington and Joy.

LEAVITTSVILLE, OHIO.—The Union Township Toll Line will construct a line from Leavittsville to Sherodsville; from Leavittsville to Algonquin, and from Algonquin to Carrollton to connect with the Bergholz exchange.

SHELBYVILLE, IND.—The Mutual Telephone Company is placing a new section of switchboard with a capacity of 1,100 telephones. A line is also being stretched between Shelbyville and Indianapolis.

WASHINGTON, IND.—The Knox County Independent Telephone Company has placed an exchange here. The exchange is equipped in modern style and is much better than its opponent. Their list of subscribers is

continually growing. The company connects with the West Shoals Independent Company.

SPIRIT LAKE, IA.—The Midland Telephone Company will install an exchange here.

ERIE, KANS.—F. N. Brelsford, of the Erie Telephone Company, is arranging some extensions to the telephone system.

SOLFILLO, MEXICO.—John Woencsner and associates, of this place, have secured a concession from the Mexican Government to construct a long distance telephone system in the northern part of the country. An exchange will be installed in Monterey, and a line will be extended from there to Tampico, San Luis, Potosi and Mexico City.

MILFORD, MICH.—James Bishop, Frank Vowles, Duane Hodges and Dr. Dean will construct a telephone line connecting with the Milford exchange and running to New Hudson.

NORWOOD, MINN.—J. D. Krause, president of the Norwood-Young America Telephone Company, is considering establishing an exchange at Waconia.

LINN CREEK, MO.—Lon King, proprietor of the local telephone system, is preparing to make connections with Jefferson City.

HAZLETON, IND.—The Knox County Telephone Company and the Independent Telephone Company, of Princeton, Ind., have connected lines at this place. This establishes a line of Independent telephone companies from Harding, Ky., to Maumee, Ind. From Maumee the chain will be extended to Chicago, and from Harding to Nashville, Tenn., and Columbus, Ohio.

MECHANICSBURG, IND.—Fire in the home of Jacob Zeikle destroyed the telephone exchange and farmers' lines.

ENID, OKLA.—George Holiday, M. M. Davis, William Russel, George Hare and others are promoting a rural telephone line to be constructed from here to Drummond, Waukomis, Carrier, Lahona and other points.

PALOUSE, WASH.—Farmers living near here have organized a company to construct a telephone line into Palouse. C. H. Patton, president of the Moscow State Bank, and H. K. Moore, of Moscow, will construct a line from Palouse to Princeton, and will install a drop switchboard here.

BOOK NOTICE

FREE HAND LETTERING: By Victor T. Wilson. Published by John Wiley & Sons, New York. 105 pages; 25 full page plates. Price, \$1.00.

This treatise is an addition to the rather small number of good books on the subject of freehand lettering. In the opening chapter the history of Roman and Gothic letters is given, followed by an analysis which will enable the draftsman to form those letters without resorting to the use of the T-square and triangle, except for limiting lines. Among the succeeding chapters there is one devoted to the subject of spacing, and another to the use of the pen in freehand work. The latter chapter contains hints on the kind of pen, ink and paper best adapted for lettering, and gives directions for the proper manipulation of the pen. The subject of titles, which is an important but rather neglected one in many drafting rooms, has a chapter devoted to its consideration. The design, laying out and execution of titles is well treated and a draftsman, after a little study of this chapter, should possess the ability to produce a very satisfactory title.

A chapter on letters for various technical purposes deals, among other things, with map and architectural lettering and some space is given to lettering for photo-reproduction and patent office drawing. The last two chapters are entitled "The Design of Lettering," and "Mechanical Aids to Lettering," respectively. In the former may be found a consideration of the principles of letters and their influence on the production of original styles. The last chapter, as its title indicates, deals with those devices which have for their object the saving of time and labor in laying out lettering. At the end of the book there is a number of plates illustrative of the matter contained in the various chapters.

The book on the whole is admirably suited to its purpose. It should afford to the practical draftsman also, a comprehensive knowledge of the general subject of lettering, and should enable him to produce good work without excessive expenditure of time.

TRADE NOTES

THE STROMBERG-CARLSON TELEPHONE MFG. Co., of Chicago, Ill., and Rochester, N. Y., announces that Mr. H. C. Hackney, Whitehall, N. Y., has been appointed as Eastern representative, with headquarters at Utica, N. Y. Mr. Hackney was formerly with the Standard Telephone and Electric Co., of Madison, Wis.

THE MANHATTAN ELECTRIC SUPPLY COMPANY. The most recent edition to the catalogue of the Manhattan Electric Supply Company has just been issued. It is quite a complicated compendium of all sorts of electrical apparatus from wire to telephones and from electric light fixtures to telegraph keys. Each article is illustrated accompanied by a brief description and a price list.

THE AMERICAN ELECTRIC TELEPHONE COMPANY of Chicago, Ill., announces that of recent switchboard sales made by it the following are samples: Monroe, S. D., 100 line express; Holden, Mo., 200 line express; Pittsburgh, Pa., Special toll line switchboard; Marysville, O., 100 line express; Garden City, Kans., 155 line express; North Platte, Neb., 100 line express; Wheeler, Ind., 100 line express.

THE ELECTRIC APPLIANCE COMPANY of 92 and 94 West Van Buren street, Chicago, is supplying a little round calendar containing on each of its sides statistics for six months, which is so arranged that it can be placed upon the head of a desk set by unscrewing the mouth-piece and inserting the card bearing the calendar underneath the rubber funnel. The idea is a good one and should appeal to the telephone user. The company will send them on request.

QUEEN & COMPANY, Philadelphia, issue a semi-centennial booklet exhibiting in a brief way some of the special apparatus which it manufactures. In some respects this is not a catalogue, for it is a brochure which is more descriptive of the various departments in the large factory controlled by this firm. The pamphlet is subdivided into a description of the seven departments, namely: The optical, mathematical and engineering, microscopical, physical and electrical, astronomical, and meteorological. There is a general description of each of these sub-divisions of the factory with an illustration of one or two of the most prominent pieces of apparatus manufactured.

THE ELECTRIC AND ORDNANCE ACCESSORIES COMPANY, LTD., Birmingham, England, has just issued an attractive catalogue describing its central energy

exchange systems. The boards which are illustrated are those which are chiefly designed for small exchanges of 100 or 200 subscribers as they are of the single position non-multiple type and are particularly planned to meet the conditions of private exchanges such as would be provided in large business houses, hospitals, etc. The circuits are arranged either for direct or alternating current signalling. A complete line of attractive substation instruments are shown which are built upon the foreign plan of combining transmitter and receiver in a single instrument. On the whole the brochure gives an excellent idea of the English method of handling telephone installations of this kind.

THE YESBERA MANUFACTURING COMPANY, Toledo, Ohio, has just issued a catalogue describing the sound-proof telephone booths for which this company in the past has been famed. The catalogue is in the shape of individual sheets describing the booths in a system of code numbers extending from 24 to 72. Each leaflet gives a specification of the material from which the particular booth under consideration is manufactured and a general account of the kind of woodwork, arrangement of doors, windows, etc., together with complete diagrams and shipping weight. There is also a general description for each one, of the sound-proof characteristics, in so far as they may be modified by the arrangement of double walls and the filling between them. The line manufactured by the company is very complete, and a booth may be purchased which is good enough for a freight house, or one may be bought which would add beauty to the finest hotel lobby or apartment house. Telephone managers all over the country are beginning to realize what dividend payers booths are, and there are many being placed. Managers will do well to send for copies of this company's sheets.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—Telephone exchange in live Southwest Missouri town, Stromberg Carlson Equipment—120 subscribers, 30 miles Toll line. Address, Box 137, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City 137

TREE WIRE—TREE WIRE—TREE WIRE.—Double or Triple Braid double galvanized Iron Wire at the RIGHT PRICE. R. B. ABBOTT, 1735 Kenmore avenue, Chicago. 136

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$AVE A DOLLAR OR \$0. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich. 131

SALESMEN WANTED.—Reliable men to carry as a side line, an up-to-date line of Advertising Fans, sold to Furniture, Hardware, Drug, Shoe and General Merchants. Convenient to carry. Prompt remittances. GEO. H. JUNG & CO., Cincinnati, O. 139

WANTED.—Position by man with fourteen years' experience, good practical, as well as theoretical, knowledge of the business; associated the past four years with one of the largest Independent companies in the country. Would accept a position in the engineering department of a manufacturing company. Good circuit man and have had installing experience. Territory west of Chicago preferred, and contract required. References given. Address, Box 132, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 132

POSITION WANTED.—By a man with seven years' experience as a wire chief in a large Western city with a modern plant. He is familiar with all branches of the business. Address Box 135, care of AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 135

POSITION.—Cable splicer desires position with some telephone or construction company. Address, Box 138, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 138

Many people have Pole Yards by the dozen. We only have three main yards, but those are pretty good sized ones, and they are situated where they do us immense good when it comes to prompt shipment of orders.


We find that railroads are much more considerate of our wants where there is a chance of the other fellow getting the orders.

We are in the same position towards you, and intend to do everything we honorably can to merit your orders. Won't you try us?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"




PITTSBURG & LAKE SUPERIOR IRON CO ESCANABA MICHIGAN

PRODUCERS AND WHOLESALERS

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

46 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

The Valentine-Clark Co.

*Begin to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

SUBSCRIPTION BLANK

Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

Enclosed find . . . for One Dollar (\$1.00)
Subscription for One Year.

Name

P. O. Address

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

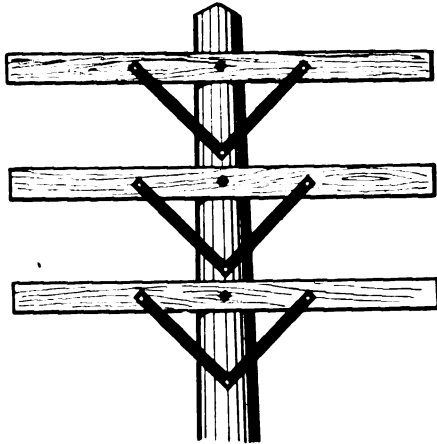
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

I
D
A
H
O

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

M
I
C
H
I
G
A
N

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

Cedar Poles

Large Stock

Prompt Ship-

ment.

LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO.- MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you.

Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.

ELKIN MACHINE CO.
ELKIN, N. C.

SPECIAL CROSS ARMS ALL HEART Long Leaf Yellow Pine

We can furnish any quantity promptly. Output 500,000 ft. per month.
Prices low—quality the best. Write us for delivered prices.

Lewis Lumber & Mfg. Co., R. R. Akers, Mgr.
HATTIESBURG, MISS.

IDAHO RED CEDAR POLES

20 to 80 FEET LONG

I can ship from

FOUR POLE YARDS

on Great Northern, Northern Pacific and Union Pacific Railways. Write for Prices.

F. L. Churchill, Heron, Montana

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Linemen's Outfits
Construction Tools



Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS

87 West Van Buren St., CHICAGO, ILL.

Chicago Insulated Wire Co.

Bare and Insulated ELECTRIC WIRES AND CABLES
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.

PRICE LIST AND SAMPLES ON APPLICATION

The Morse
Cedar
Co.

CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.

Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

POLES

Large Stock

10 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

FRANCIS
BEIDLER
& CO.
459-519 W 22d St.
CHICAGO, ILL.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter and complete Telephone Sets. Send for booklet. ☛ ☛ ☛ ☛

74 CORTLANDT STREET,

NEW YORK CITY

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

ELECTRICAL ENGINEER
AND CONTRACTOR " " "
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL. \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE

DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltameters, Millammeters, Ohmmeters. Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

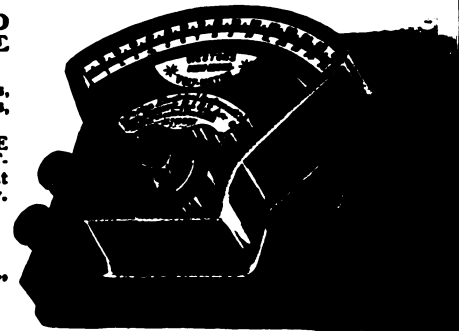
Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

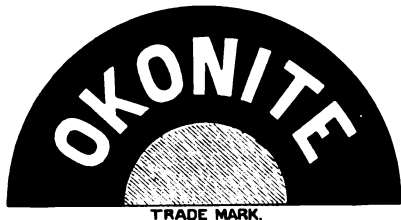
New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION



The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDÉE, } Managers
H. DURANT CHEEVER }

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on all Matters Pertaining to Telephone Troubles and their Remedies on both Magneto and Common Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

THE
MATCHLESS SPLENDORS
of the
CANADIAN ROCKIES

BANFF, the LAKES in the CLOUDS, YOHO VALLEY the GREAT GLACIER—a region described by Whymper, the conqueror of the Matterhorn, as fifty or sixty Switzerlands rolled into one—reached only by the

CANADIAN PACIFIC RAILWAY

Daily trans-continental train service throughout the year from Toronto and Montreal. Sleeping and dining cars attached to all through trains.

First class hotels in the mountains. For rates, etc., apply to nearest agent of the Canadian Pacific Railway, or E. V. Skinner, 353 Broadway, N. Y.

ROBERT KERR,

Passenger Traffic Manager, Montreal.

THE
NORTH-WESTERN
LINE

California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.

THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.

THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night, Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.

W. B. KNISKERN,
Passenger Traffic Manager,
Chicago.

To Upper Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway

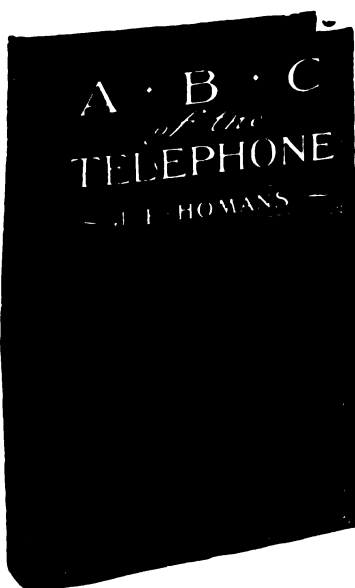
Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent.

CHICAGO, ILL.



New and Revised Edition of the A. B. C.
of the Telephone and a year's
subscription to

THE AMERICAN TELEPHONE JOURNAL

\$1.50

The regular price of the "A. B. C." is \$1.00. This edition has been revised and brought up-to-date by the author, and is now one of the best books on telephony in print.

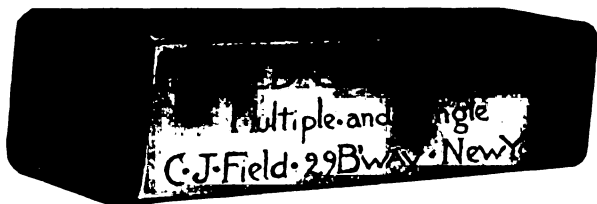
THE AMERICAN TELEPHONE JOURNAL

is the best telephone paper published. The subscription price is \$1.00 for 52 numbers (1 year). Cut this out and send in your name now for this special offer.

Name.....

P. O. Address State.....

NOTE—This offer is not good on renewals of subscriptions



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, *and at much less cost.*

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarred by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago Ill.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Bendler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, F. L., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.
Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

170 Broadway, New York, N. Y.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the WESTERN ELECTRIC COMPANY.

ADVERTISERS' DIRECTORY—Concluded

- | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.</p> <p>POWER PLANTS.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>PROTECTORS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.</p> <p>SEALS.
Middleton & Co., J. W., Chicago, Ill.</p> <p>SIGNS.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.</p> <p>SOLDER, RESIN CORE.
Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>STATIONERY.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.</p> <p>STEEL.
Leslie A. C., & Co., Montreal, Can.</p> <p>STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.</p> <p>SWITCHBOARD DROPS.
Columbia Electric Co., McCordsville, Ind.</p> | <p>SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.</p> | <p>Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONE BOOTHS.
Yesbera Manufacturing Co., Toledo, Ohio.</p> <p>TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.</p> <p>TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Columbia Electric Co., McCordsville, Ind.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> | <p>International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co. Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.</p> <p>TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>TOLL TICKETS.
Gildart Bros., Albion, Mich.</p> <p>TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Rochling's Sons Co., John A., Trenton, N. J.
Seovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co., Pittsburg, Pa.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Experience
is a wise teacher
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**



LEICH FOUR-PARTY SELECTIVE TELEPHONES

THOUSANDS IN SUCCESSFUL OPERATION

CENTRAL ENERGY OR MAGNETO

No Springs to Adjust—No Relays
—Condensers in Circuit to
Stop the Battery Flow

A Few of the Larger Exchanges
Now Using the System

Mansfield, O.	Youngstown, O.
Massillon, O.	Lima, O.
Trenton, N. J.	Ft. Worth, Tex.
Terre Haute, Ind.	Jackson, Tenn.
Reading, Pa.	Allentown, Pa.
Tampa, Fla.	Brazil, Ind.
Kewanee, Ill.	Springfield, Mo.

ONLY ALTERNATING CURRENTS
USED FOR RINGING

The American
Electric Telephone Company
CHICAGO



THE AMERICAN TELEPHONE JOURNAL

A Thing That Isn't Worth Advertising—

isn't worth selling. No matter how small it is, if people need it, you can sell by advertising. If nobody knew you, you couldn't sell a dollar's worth. If a few people know you, you'll sell a few. The more people that know you, the more you'll sell.

Let us introduce you to the 6,000 weekly readers of this paper—more than all other periodicals combined.

Proof:

The American Telephone Journal has sold more of my electric measuring instruments than all other mediums. The replies received show that the Journal covers the field most thoroughly, and that it goes to the buyer.

LOUIS M. PIGNOLET,
Measuring Instruments,
New York.

Contents, Page 3

Advertisers' Directory, Page 9

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—FEBRUARY 27, 1904—CHICAGO Number 9

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

WHY THE NEW MICHIGAN BELL COMPANY MUST FAIL.....By J. B. Ware
TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION, ARTICLE II.....By Frank F. Fowle
OHIO INDEPENDENT CONVENTION
A SIMPLE POLE RAISING DERRICK
OWENSBORO, KY., COMPANY INCREASES ITS CAPACITY
A SOURCE OF CROSS TALK.....By Henry Field

The Operating Field:

IOWA ASSOCIATION MEETING
A CONNECTICUT RIGHT OF WAY CASE
TELEPHONE STATEMENT FROM KANSAS CITY
AN UNSOLICITED TESTIMONIAL
SOUTH CAROLINA TELEPHONE BILL
TELEPHONED FROM A KITE
TELEPHONE BILL IN VIRGINIA KILLED

THE USE OF INDICATING PLUGS
YORK STATE TOLL LINE COMPLETED
EXCHANGE BURNT AT REED CITY, MICH.
TELEPHONIC LOSSES AT BALTIMORE FIRE
A BANQUET BY TELEPHONE
UNLAWFUL TO SWEAR OVER THE TELEPHONE
ONE WAY TO INSTALL UNDERGROUND DUCT

THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 144.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

Eaco No. 36 Telephone

COMPACT TYPE CABINET.

The one we pride ourselves on; an exchange favorite; neat, compact, takes little wall space; handsome from every point of view; low in price.

5-Magnet Generator Type especially recommended for rural or heavily loaded lines.

Is equipped with a new and extra large generator. Guaranteed to ring more bells satisfactorily than any other.

Has a Carbon Lightning Arrester.

Noxem Double Pole Receiver (no exposed metal parts), Type B Transmitter.

Long lever hook with platinum contacts. Two cells 1900 Dry Battery.

Woodwork is finished to a Piano Polish.

Special Offer:

The above telephone will be furnished complete as shown, **\$11.00.**

Leaflet Giving the Whole Story Upon Application.

Electric Appliance Co.,

Telephone Manufacturers; Electrical Supplies.

92-94 W. Van Buren St.,

CHICAGO.

SUBSCRIPTION BLANK

Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

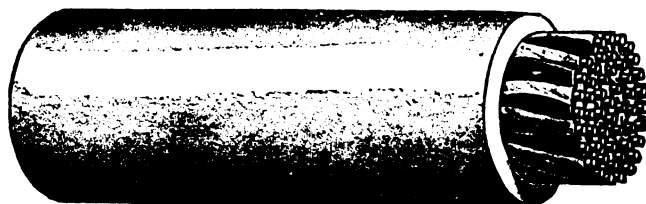
.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....

Write
Today



Our
Telephone
Cables

400 PAIR
AND SMALLER

Need no introduction

Let us quote on your Specifications

THE F. BISSELL COMPANY
TOLEDO, O.

Bulletin 226 on

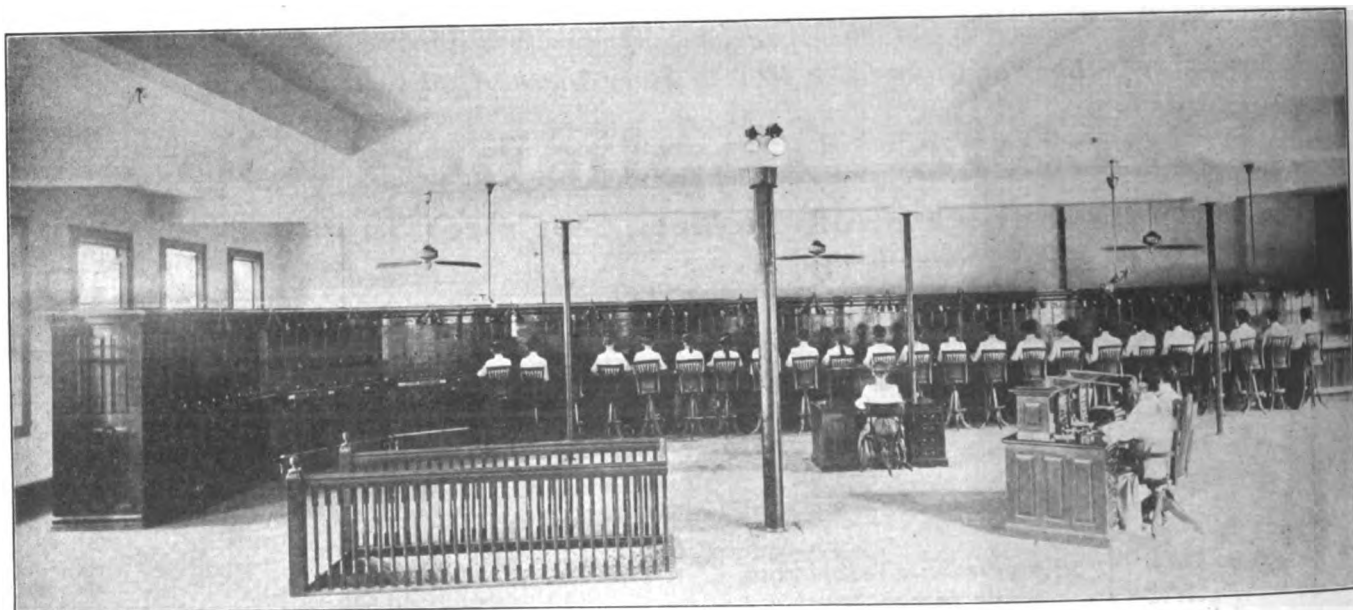
WIRES
CORDAGE
STRANDS
and
CABLES

will be sent pre-
paid on request

What the President says

"I am very much gratified with the success the Atlanta Telephone and Telegraph Company has attained within the last six months. It has pretty nearly doubled its business in that time, and its cash receipts have grown immensely for the short time this company has been able to give service with its new switchboard and its new telephones. The time has come when it is not a question of getting business, but a question of constructing lines and putting in telephones for those who apply to us for service."

"GROWTH IN ATLANTA, GEORGIA," by Pres. Jerome Simmons.



Main Exchange of Atlanta (Ga.) Telephone and Telegraph Company

The above exchange built and installed by the Stromberg-Carlson Tel. Mfg. Co.

It would be useless to attempt to compete with a modern Bell exchange with inferior apparatus. The above clipping denotes the success of a competing independent exchange when equipped with the best apparatus obtainable.

Our Bulletin No. 5-B on Central Energy Telephones tells why they are superior to all others. Mailed upon request.

Stromberg-Carlson Tel. Mfg. Co.

General and Eastern Office

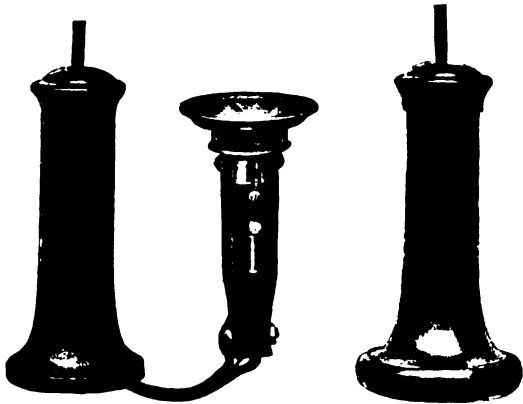
Sales Dept.

Rochester, N. Y.

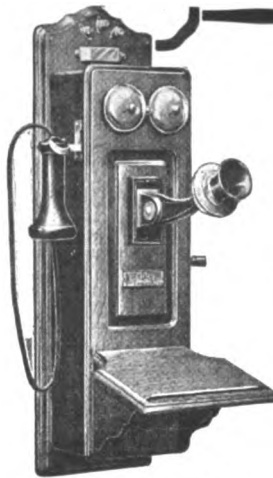
Chicago, Ill.

For the Good of Your Service

USE

Century No. 10 ReceiversPerfect
MechanicallyPerfect
Electrically

CENTURY TELEPHONE CONSTRUCTION CO.,
536 Ellicott Square,
BUFFALO, N. Y.

WRITE
TO-DAY

**THE
NORTH
ELECTRIC
CO.**

CLEVELAND,
OHIO, U. S. A.

156 St. Clair St.
166

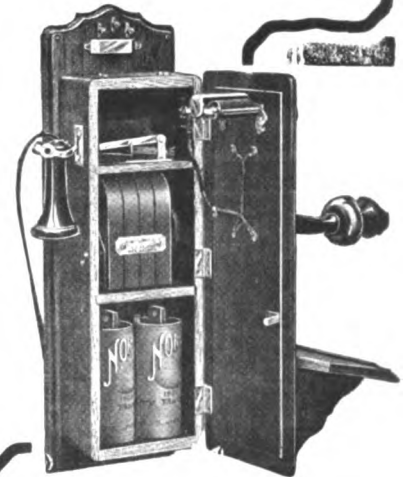
C. N. 160

All Right for Quality

Well Balanced Equipment

**TELEPHONES
THAT NEVER
WEAR OUT**

TRY ME

**We Admit**

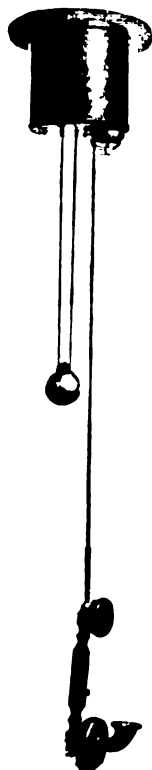
That some years ago, when we, among others, began making the ordinary desk sets, we felt that the last step had been taken in the direction of comfort and luxuriousness in Telephony—but we, *among others*, were wrong.

Since then we, *among all others*, are the only ones who have gone beyond, *ahead, above* the rest. We offer, at the same price,

A perfect instrument that is never in the way of anyone or anything.

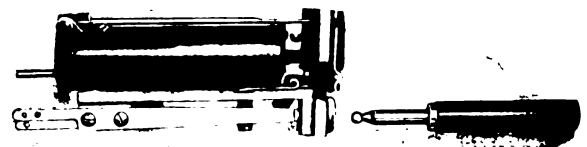
Movable down, up or at any angle, usable anywhere and returnable at will. Order now.

The Pendent Telephone
THE VOUGHT-BERGER COMPANY
 MAKERS OF FIRST-AWARD
Telephones, Switchboards and Appliances
 LA CROSSE, WISCONSIN

**INTERNATIONAL
Telephone Mfg. Co.**

**Mechanical Self Restoring Drop
SWITCH BOARD**

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

**International Telephone
Manufacturing Co.**
CHICAGO, ILL.

Multiple Switchboards

**T
E
L
E
P
H
O
N
E
S**

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

**T
E
R
M
I
N
A
L
S**

PROTECTIVE DEVICES



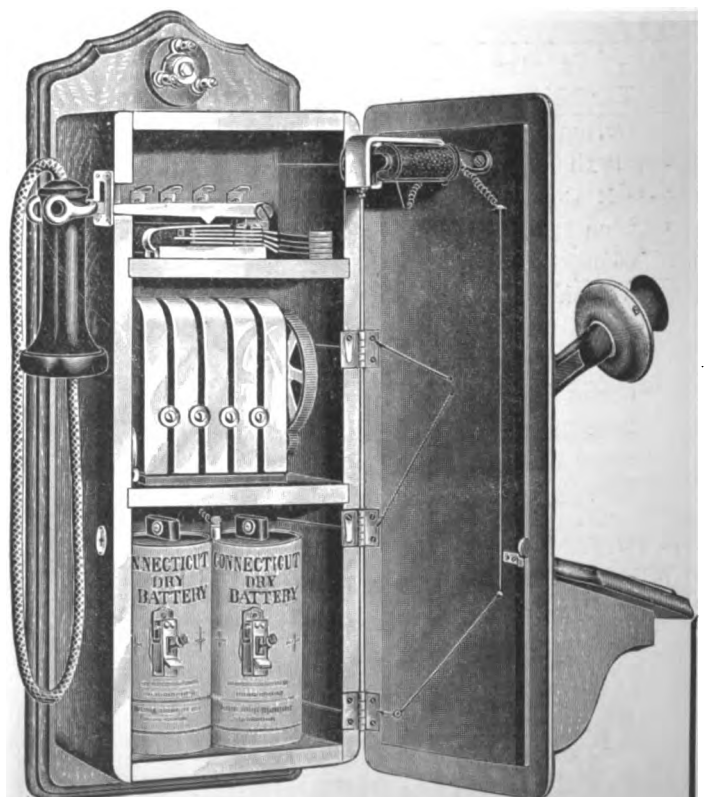
The Survival of the Fittest

Takes place in every city or town where two telephone companies compete for patronage. **That company which gives the best service will survive.** The best telephone service in the world to-day is Automatic, and we installed the exchanges which give it.

From these facts draw a moral.

Automatic Electric Co.

CHICAGO, U. S. A.



Strongest and best Telephone on earth
The special quantity price will interest you
**CONNECTICUT TELEPHONE
AND ELECTRIC CO.**
MERIDEN, CONN., U. S. A.

Kellogg Switchboard and Supply Company

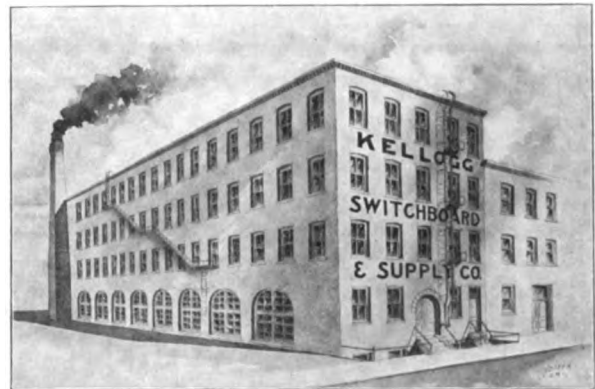
CHICAGO, ILL.



MAIN FACTORY AND GENERAL OFFICES,
CONGRESS AND GREEN STREETS.



FACTORY NO. 2.



GENERAL WAREHOUSE.

The Kellogg Switchboard and Supply Company have just rented and equipped Factory No. 2 with 34,000 square feet of new floor space. This space, together with our main factory, is entirely devoted to switchboards and telephones. We have also increased our warehouse capacity to 35,000 square feet, and have filled same with a complete stock of our standard make of telephones. Our entire plant equipped throughout with modern machinery and manned by the most expert mechanics affords unexcelled facilities for the manufacture of the highest grade of telephone apparatus.

Our increased factory capacity enables us to make everything not in stock at very short notice. We are prepared to fill from stock all orders for telephones of standard types. Orders for magneto or common battery switchboards will be filled with unusual despatch.

We manufacture no inferior grades. Our apparatus as to quality, durability and beauty will be strictly maintained. Write for prices.

**KELLOGG SWITCHBOARD and SUPPLY COMPANY,
CHICAGO**

346 Broadway
New York

Electric Building
Cleveland

Keystone Telephone Building
Philadelphia



MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

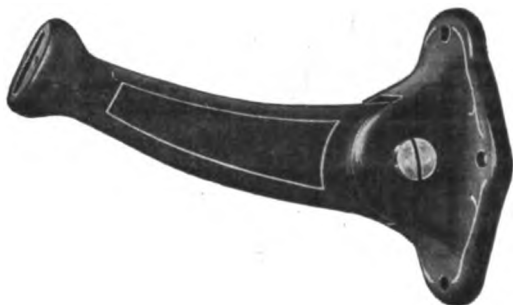
MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

WE HELP TO MAKE

**A Good
Telephone**



ADDRESS "BARRARM," CLEVELAND

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 163 Randolph St., Chicago, Ill.

No. 12 Telephone for Interior Systems

The finest inter-communicating Telephone ever made, seems like a big statement, don't it? Well, just order one and compare it with other makes and you will agree with us.

**Send us a
trial order**

Don't fail to send for bulletin 6, describing No. 12 Telephone.

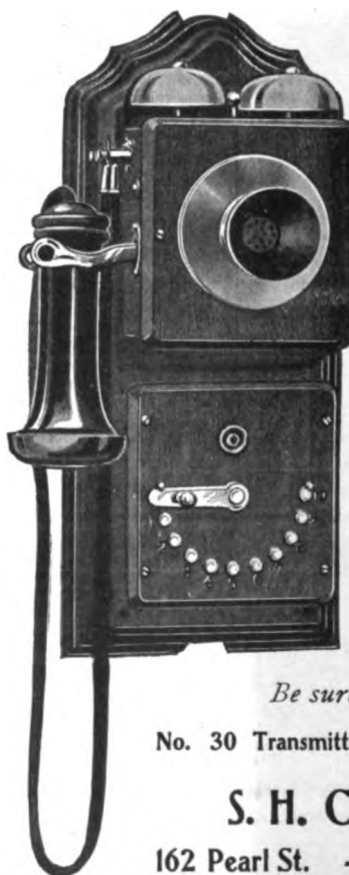
We make a lot of good things.

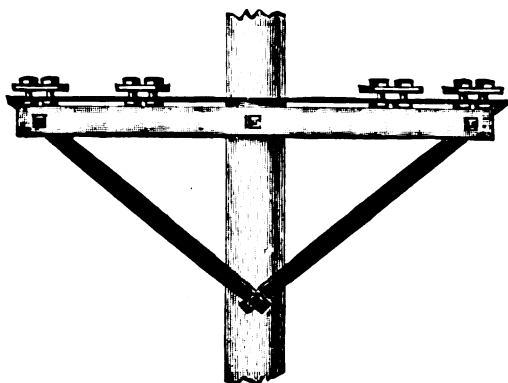
Be sure and write us.

No. 30 Transmitter by mail prepaid \$1.75

S. H. COUCH CO.

162 Pearl St. - BOSTON, MASS.





"Ready" Cable Arms

Made for any number of cables

We Are Headquarters for

Telephone Cable, Strand, Construction Tools, Ready Reels, Telephones and Supplies

SEND FOR OUR ESTIMATE SHEET

THE W. G. NAGEL ELECTRIC CO.
416 Huron Street, TOLEDO, O.

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Dickey Clay Mfg. Co., W. S..... 36	Klein, Mathias, & Sons..... 33	Roebbling's, John A., Sons Co..... 32
American Electric Teleph. Co..... 40	Eastern Telephone Mfg. Co..... 9	Leslie, A. C., & Co..... 8	Sand Point Cedar Co..... 30
Am. School of Correspondence..... —	Electric Appliance Co..... 3	Lewis Lumber & Mfg. Co..... 33	Scovill Mfg. Co..... 2
American Vitrifed Conduit Co..... 39	Elkin Machine Co..... 33	Lindsley Brothers Co..... 32	Shaw-Walker Co..... 12
Andrae, Julius, & Sons Co..... 10	Ericsson Telephone Co..... 10	McIntire, C., Co..... 36	Standard Underground Cable Co..... 12
Automatic Electric Co..... 6	Fahnestock Transmitter Co..... 34	Maltby Lumber Co..... 29	Stanton L. W..... 34
Barr, W. J., Mfg. Co..... 8	Field, C. J..... 36	Michigan Cedar Co..... 33	Sterling, W. C., & Son..... 31
Beidler, Francis & Co..... 33	Fowler, John H..... 32	Middleton, J. W., & Co..... 34	Sterling Electric Co..... 6
Bissell Co., The F..... 2	Franklin Rolling Mill & Fdy. Co.. 31	Miller Anchor Co..... 8	Stromberg-Carlson Telephone Mfg. Co..... 4
Butterfield, J. F..... 34	Gest, G. M..... 38	Monarch Telephone Mfg. Co..... 8	Swedish-American Tel. Co..... 12
Camp, The H. B. Co..... 39	Hemingray Glass Co..... —	Morse Cedar Co..... 33	Telephone Printing Co..... 33
Central Mfg. Co..... —	Holtzer-Cabot Electric Co..... —	Nagel, W. G., Electric Co..... 9	Valentine Clark Co..... 30
Central Telephone & Electric Co.. —	Huebel, C. J., & Co..... 39	National Wire Corporation..... 33	Vought-Berger Co..... 5
Century Telephone Const. Co..... 5	Hyde, W. H., & Co..... 24	New Haven Novelty Machine Co.. 2	Wanted, Situations, etc..... 144
Chicago Insulated Wire Co..... —	Imperial Finance & Cons. Co.... 34	North Electric Co..... 5	Weston Electrical Instrument Co.. 34
Chicago Writing Machine Co..... 11	Ingram-Richardson Mfg. Co..... 12	Nungesser Electric Battery Co.... —	Wisconsin Timber & Land Co.... 33
Churchill, E..... 33	Index of the Technical Press..... —	Okonite Company..... 34	Worcester, C. H., Co..... 29
Cohn & Bock..... 33	Inland Steel Co..... 32	Pacific Coast Pole Co..... 30	Yesbera Mfg. Co..... —
Columbia Electric Co..... —	International Telephone Mfg. Co.. 5	Pignolet, L. M..... 30	Cunningham Iron Co., Boston, Mass.
Connecticut Teleph. & Electric Co. 6	Kellogg Switchboard & Supply Co..... 7	Pittsburg & Lake Superior Iron Co. 29	Field, C. J., New York.
Cook, Frank B..... —	Bissell Co., The F., Toledo, O.	Pittsburg Sewer Pipe & Conduit Co..... 36	Gest, G. M., Cincinnati, O.
Couch, S. H., Co..... 8	Chicago Insulated Wire Co., Chicago, Ill.	CABLE SLEEVES.	Nagel, W. G., Electric Co., Toledo, O.
Crumb, W. H. Co..... 34	Kellogg Switchboard & Supply Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	New Haven Novelty Machine Co., New Haven, Conn.
Cunningham Iron Co..... 36	Nagel, W. G., Electric Co., Toledo, O.	CARD INDEX SYSTEMS.	Shaw-Walker Co., Muskegon, Mich.
BATTERIES.	National Wire Corporation, New Haven, Conn.	CLIMBERS.	Klein & Sons, Mathias, Chicago, Ill.
Andrae, Julius, & Sons Co., Milwaukee, Wis.	Okonite Co., New York.	Nagel, W. G., Electric Co., Toledo, O.	CONDUCTS.
Electric Appliance Co., Chicago, Ill.	Roebbling's Sons Co., John A., Trenton, N. J.	CONECTORS.	American Conduit Co., Chicago, Ill.
Nungesser Electric Battery Co., Cleveland, O.	Standard Underground Cable Co., Pittsburgh, Pa.	CONSTRUCTION SUPPLIES.	American Vitrifed Conduit Co., New York.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	American Electric Tel. Co., Chicago, Ill.	Camp Co., The H. B. New York.
BONDS.	CABLE HANGERS.	Electric Appliance Co., Chicago, Ill.	
J. W. Middleton & Co., Chicago, Ill.	Bissell Co., The F., Toledo, O.		
BRASS.	Cook, Frank B., Chicago, Ill.		
Scovill Mfg. Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.		
BOOTHES.	Standard Underground Cable Co., Pittsburgh, Pa.		
Yesbera Mfg. Co., Toledo, O.			
CABLES.			
American Electric Tel. Co., Chicago, Ill.			

WANT AND FOR SALE ADVERTISEMENTS, PAGE 144.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

Eastern Telephone Manufacturing Co.

MAKERS OF

HIGH GRADE TELEPHONE EQUIPMENT

Series Telephones
Bridging Telephones

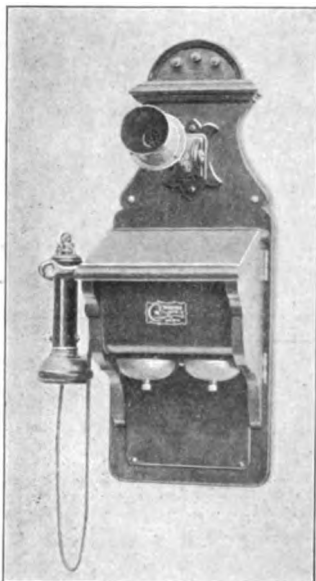
Common Battery Telephones
Special Designs

WE SOLICIT CORRESPONDENCE

WESTCHESTER

PENNSYLVANIA

First Cost---Only Cost



Ericsson Telephones are the cheapest to maintain on the market. Always in prime condition. Never affected by climatic changes.

"Quality of Ericsson Telephones is remembered long after the price has been forgotten."

Ericsson Telephone Co.

"Strictly Independent."

Manufacturers and Importers of Switchboards, Telephones and Telephone Supplies, for Magneto and Common Battery.

296 Broadway,

New York.

ADVERTISERS' DIRECTORY--Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

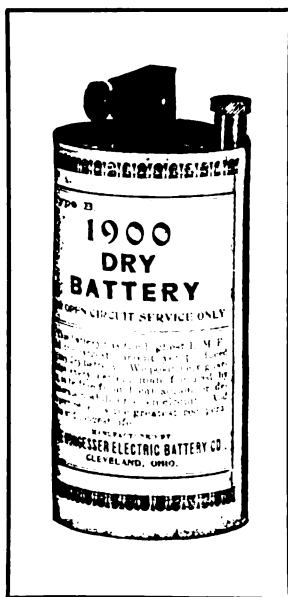
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburgh, Pa.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

*Complete Stock
Always on Hand*

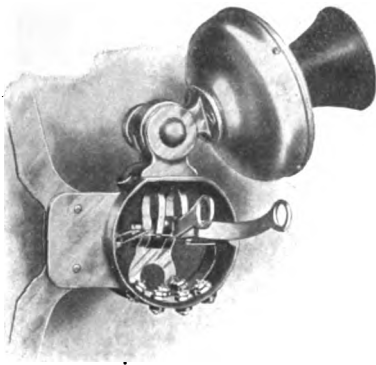
JULIUS ANDRAE & SONS CO.,

MILWAUKEE,
WIS.

Distributors of Telephone Supplies and Construction Material

Short Talks on THE ADJUSTAPHONE

No. 1--The Switch-hook



We begin with the switch-hook because that's the vital part of the desk telephone. Every telephone man knows that a poor switch-hook will cause more trouble than two Irish aldermen in a Swedish ward.

The Springs Can't Wear Out.

The ratio of condensation in the springs is so slight that no amount of use can impair them. They are made of German silver—the contacts being genuine pure platinum points.

The curve of the springs allows for much greater length, and also permits of confining them in a compact space. The slight strain of condensation is distributed throughout their entire length, instead of being confined to one point—a faulty method of construction entirely too prevalent.

The relative position of the springs is such that a positive sliding contact is provided.

The illustration above will give you some idea of our switch-hook and springs. We'll give you a better idea by sending some ADJUSTAPHONES to you on trial—equipped with ANY TRANSMITTER and RECEIVER, and wired for use WITH ANY SYSTEM.



Telephone Department

CHICAGO WRITING MACHINE CO.

105 Wendell Street, Chicago

YOU WILL FIND



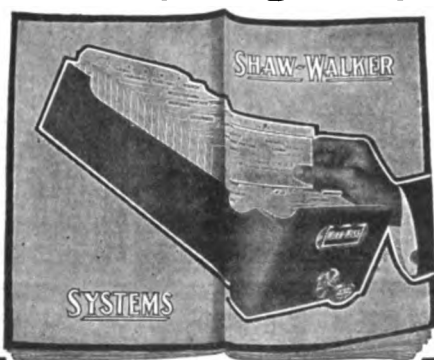
**SWEDISH
AMERICAN
APPARATUS**

ALL OVER THE COUNTRY

There's a Reason. *Get our Prices and Descriptive Matter.*

SWEDISH-AMERICAN TELEPHONE CO., Chicago, Ill.

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

All the big Companies
use them!



ENAMELED IRON SIGNS

Shall we
quote you?

INGRAM-RICHARDSON MFG CO.
BEAVER FALLS, PA.



**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, FEBRUARY 27, 1904

NUMBER 9

WHY THE NEW MICHIGAN BELL COMPANY MUST FALL.

By J. B. WARE.

EARLY in December last the United States District Court at Detroit confirmed the sale of the property of the Michigan Telephone Company (Bell) by the Union Trust Company as receiver for the bondholders. For the purpose of reviewing the Bell telephone interest in this State, the Michigan State Telephone Company has been incorporated, and the plan of reorganization includes the ultimate issue of the following:

First mortgage bonds, 5 per cent.	\$10,000,000
Preferred stock, 6 per cent.	4,000,000
Common stock	6,000,000 \$20,000,000

To pay the expenses, salaries and commissions of those identified with the receivership; also of the bondholders' committee, and the reorganization committee; and to furnish means of payment for the Michigan Bell property, the new company is to issue, of the above authorized capital, the following:

First mortgage bonds	\$4,466,000
Preferred stock	2,285,000
Common stock	3,500,000 \$10,251,000

Certain facts connected with the telephone history of the state are of special interest at this time. The Michigan Telephone Company was incorporated in 1883. In 1899 the Erie Telephone Company, under President Glidden's management, purchased the control of the company, and promptly increased the stock issue from \$2,500,000 to \$5,000,000, and the bond issue from \$785,000 to \$5,000,000. With a part of the proceeds of the sale of the increased stock and bonds was purchased three opposition companies and the control of the New State Telephone Company, the said four companies operating 10,889 telephones.

In order to secure the control of the New State Company for the purpose of sale to the Bell, the officers of said company issued a circular to the stockholders, explaining that it would be advantageous to increase the stock of the company, and thus secure funds to take care of the very large growth of both exchange and toll business, which was crowding upon the company. These officers secured sufficient proxies, which they had prepared in such manner as to give power of attorney to the party receiving the proxy, to enable them to amend the articles of incorporation, and increase the capital as they might determine advantageous. They completed arrangements with the Bell officials, to sell the control of the capital stock to the Michigan Bell Company. The New State officials then amended the company's articles, and increased the capital \$700,000, which, with their private holdings of stock, was promptly sold and transferred to the Michigan Bell Company. Then the minority stockholders in the company were forced to accept Michigan Telephone Company's stock in exchange for their holdings, thus securing the property of the company to the Michigan Bell, which property included the purchase money in the treasury of the New State company, realized from the sale of the \$700,000 of the stock above mentioned. Through this action of their officials, the stockholders of the New State company were

betrayed into exchanging their holdings for Michigan Bell stock (and in the recent sale of the Michigan Telephone Company's properties this stock has been entirely cut off, without any compensation). In addition to the above, the Michigan Telephone Company used the proceeds from the sale of its stock and bonds to increase the number of telephones in service, and at rates that in many instances were much less than the average cost of operation. By this method the total number of Bell telephones was increased from 20,000 in 1899 to about 49,000 in 1902.

In connection with the purchase of the companies above mentioned by the Michigan Bell, said Michigan Company assumed and guaranteed a mortgage of \$594,000 upon the property of the Detroit Telephone Company. Thus, at the time of the foreclosure sale of the Michigan Telephone property in December last, there was outstanding the \$5,000,000 mortgage upon its property and the \$594,000 mortgage which it had guaranteed. While the reorganization plan, as announced, makes no mention of this latter mortgage, it had previously given out, through the Detroit newspapers, that bondholders of this latter mortgage would be included in the reorganization scheme of settlement, although on a less favorable basis than were the bondholders of the Michigan Bell Company's mortgage.

If both mortgages are included, as suggested, then the 5 per cent. bonds outstanding against the Michigan Bell property at the time of sale was \$5,594,000. The new organization is to have an immediate issue of 5 per cent. bonds, and 6 per cent. preferred stock, aggregating \$6,751,000, as above mentioned.

The question naturally arises whether the new company can pay interest on \$1,157,000 more interest-bearing securities than the old company had upon the same property. In case the Detroit company bonds are not included in the figures given out by the reorganization committee, then the increased amount of interest-bearing securities would be \$1,751,000, the interest of which would annually exceed an average income of \$2 per telephone on every Bell telephone now in the

State. The old company failed because it could not pay its interest on the \$5,000,000 mortgage, and defaulted the same on July 1, 1902, and July 1, 1903. The receiver was appointed in February, 1903, twenty years after the original incorporation of the company. During the first twelve years of its existence it had no competition. For the past five years competition has been very active and successful. The Independent companies have developed practically all of the State occupied by the old Bell company, except that included in a thirty-mile strip lying along the east side of the State, on the lakes and the Detroit River. Many of the people of Michigan, especially those who have invested in Michigan Bell stock and lost, are fully aware of the character of the corporation that deceived them, and it is very probable indeed that the floating of the new project will be a difficult task.

In lower Michigan the Independents, other than in the thirty-mile strip, have more telephones and a better service than have



J. B. Ware.

the Bell interests. In the upper Peninsula the relative strength is about equal. In no instance has the Bell company driven out an Independent company, and in no case has an Independent company failed. The Independent companies in this State have no bonds on any of their properties, with two exceptions, save where the entire proceeds of such bonds were used in the construction. In other words, with the exception of two companies, as indicated, the entire bond and stock issued by Independents in Michigan *does not exceed the actual cost in cash* of the labor, material and apparatus used in the construction of their plants. There is no water in the capitalization of the Independent companies.

The result is, that with unincumbered property, the companies owning and operating considerably over half of all of the Independent telephones in the State, have paid regularly, for five years or more, 8 per cent. cash dividends annually. The Independent companies have had constant growth, and are to-day operating nearly 50,000 telephones in the State, being about the same number as the Bell telephones in service.

The conditions existing in the Michigan telephone field to-day between the two interests show a strange contrast. The Independents, as a rule, have unincumbered property, have better construction of exchanges in the large majority of cities and towns occupied by both interests, are furnishing the public with satisfactory exchange service, have a more complete system of State or toll lines in the territory occupied than has the Bell interest, are as a rule operating under franchises having maximum regulation of rates, which are about 60 per cent. of those charged by the Bell company before competition, have a successful record up to date and have confidence in their ability to compete with any Bell opposition.

On the other hand, the Bell interests in the State have their property encumbered with bonds and *preferred* stock for a much larger amount than all the Independent properties have cost. In addition, they have a very large amount of common stock; much of the exchange and toll line construction is old and badly in need of rebuilding. As a rule the exchange service furnished is not satisfactory to the public, nor has it been; its State line service and rates are not satisfactory in a majority of instances; it has no franchises regulating rates; where competition exists usually Bell rates are lower than those of the competing company; in cities and towns having no competition, that are occupied by the Bell, the rates are very much higher than in other cities and towns of the same size having competition; it has a record of failure and mismanagement in the past, and it is looked upon by the people of Michigan with distrust.

In addition to the above conditions the fact that the Independent

companies pay no royalties, while all Bell companies are compelled so to do, has been a very important factor. The Independent companies will never have to pay royalties, while Bell companies must always pay them if the American Telephone & Telegraph Company continues to exist.

It is noticeable in the reorganization plan that not only is a large amount of common stock issued—sufficient in fact to control the company—but it is pooled and, as stated by the committee, “thus securing permanency and harmony.”

While the minority stockholders of the old Bell company receive absolutely nothing for their holdings, they see the new organization permanently controlled by a stock having no value to-day, and presumably costing its holders little or nothing.

Of the \$5,000,000 of stock of the old Michigan Telephone Company, the parent Bell company (the American T. & T. Company) owned \$3,687,300, and the remainder of the stock, \$1,312,900, was owned by 743 minority stockholders. Many of these stockholders feel, that the parent Bell interests are being cared for in the reorganization plan, for otherwise why should the Bell company be willing to lose its \$3,687,300 of stock and cover \$2,500,000 of indebtedness owing it by the Michigan company, provided the property had the value which the reorganization committee places upon it. If this supposition on the part of the minority stockholders is not correct, then the conclusion must be reached by the public that the reorganization committee has greatly over-capitalized the property of the Michigan company.

The personnel of the new company is of interest, especially to those who may become holders of any of the securities of the Michigan State Telephone Company. When the Michigan Telephone Company was first organized, and for many years thereafter, the Hon. James McMillan was its president, and with his partner, Mr. J. S. Newberry, comprised two of the largest stockholders of the company. Another large stockholder was Mr. W. L. Jackson, for years the general manager of the old Bell company. In the new organization the sons of the first two gentlemen are prominent, being Mr. W. C. McMillan and M. T. H. Newberry, and Mr. Jackson is again to assume the active management of this telephone property.

The Michigan State Telephone Company, overburdened at the very beginning in its capitalization, and with many obstacles, as in part herein indicated, will not be able to successfully conduct the business to that extent that it can pay its interest on the bonds and preferred stock from its earnings, even temporarily. The people of Michigan believe the financial success of the new company impossible. The Independent companies have no fear whatever as to the competition of the new organization.

OHIO INDEPENDENT CONVENTION

THE annual convention of the Ohio Independent Telephone Association was held at the Grand Hotel, Cincinnati, February 17 to 19. A large delegation of Indiana and Kentucky Independent Telephone men attended the meeting as guests of the Ohio association, and in all nearly 150 operating companies were represented.

The first day was given over to the registration of delegates and the examination of exhibits. About 30 manufacturers and supply houses were represented and had provided elaborate displays of their goods.

The business meeting was held on the second day. The morning session opened with an address by the president of the association, W. Gilbert Thompson, of Lebanon, O. He briefly reviewed the events leading up to the calling of the convention at Cincinnati, which is one of the very few large cities in the country in which the telephone service is dominated and controlled by the Bell interests. He stated that perhaps the holding of the convention in that city would impress the local business men with the strength and extent of the Independent telephone interests in Ohio and adjoining States, and awaken them to the fact that business of incalculable value was being diverted from the city because of a lack of toll connection with Independent companies, which are

rapidly crowding the Bell companies out of the towns and rural districts.

At the conclusion of his address, President Thompson named the following committees:

COMMITTEE ON CREDENTIALS.—J. H. Thiedeck, E. L. Frazee, J. W. Chambers.

COMMITTEE ON LEGISLATION.—James S. Brailey, Jr., Frank L. Beam, O. M. Bake.

NOMINATING COMMITTEE.—A. H. Doudna, W. H. Baum, L. M. Flesh.

FINANCE COMMITTEE.—W. F. Crossley, Stanley Outcalt, William Hoyle.

Following the naming of the committees was a paper on the “Independent Telephone Situation,” by James B. Hoge, of Cleveland. Mr. Hoge traced in a historical way the use of the term “Independent” as applied to the telephone. It first appeared in 1894, at which time there were less than 300,000 telephones in operation in the entire United States. As many of the original patents expired in that year there was a veritable “declaration of independence” on the part of those interested in the future development of the telephone. Mr. Hoge said, in part:

“It is generally conceded to-day that the service over the lines

of the United States Telephone Company of Ohio, the New Long Distance Telephone Company of Indiana, the Independent long distance lines of Kentucky, and the Kinlock Long Distance Company of St. Louis is as good as that given by any company in existence. This might be said of a number of others. The various

trunk line of the long distance systems will be connected this year so that it will be possible to talk from Philadelphia to Kansas City and Topeka, Kan.; from Albany, N. Y., to St. Paul, Minn.; from Chicago, Ill., via St. Louis, to San Antonio and Galveston, Texas, and between practically all of the other cities where Independent exchanges are installed east of the Rocky Mountains. There is also quite a development on the Pacific Coast. The general manager of the Los Angeles Company advises that they now have over 11,000 telephones working, with several thousand on the waiting list, and that this year will see a large development

at other points in the State. The development around Seattle, Wash., is now being put on a substantial basis, and the manager of the exchange at Portland, Me., advises that this year will see a very large increase in their number of subscribers, and also increased development of their toll lines. An officer of the Kansas Independent Telephone Association writes: "We have an excellent State organization, which includes in its membership about 85 per cent. of the commercial operating Independent plants in the State. Our State organization does not admit so-called mutual concerns. There are probably 50,000 Independent telephones in this State, exclusive of the farmer mutual lines."

"I know of a company that has increased its investment during a given period 19½ per cent., and increased its *net* receipts during the same period 46½ per cent., or more than 17½ per cent. *net* upon the capital invested. This increase placed that company upon a substantial basis. The company now has over 45 per cent. more telephones than their competitor. I know another company that increased their net earnings over 35 per cent. without raising the rates by collecting up closely and attending strictly to business, and by the expenditure of a very small amount for securing new business. This is not possible with all companies; the best managed companies do not lose on account of poor collections over ½ of 1 per cent. of their gross charges, many of them losing less than one-tenth of 1 per cent."

At the conclusion of his paper Mr. Hoge illustrated by means of maps the growth and present extent of the Independent systems in the entire United States.

Following, there was a general discussion of the paper, participated in by many of the delegates. Mr. Frank L. Beam, of Columbus, called attention to the fact that there were present at the convention two of the original five who met at the Chittenden Hotel, Cincinnati, in 1895, to organize the first State association. Mr. Beam also impressed on the delegates the necessity of developing the long-distance lines and of encouraging the movement to give Cincinnati an Independent system.

After the discussion of the paper a musical program was rendered, followed by the reading of a paper on "Party Lines," by John P. Rhodes, of Zanesville, Ohio. In part Mr. Rhodes said:

"Few Independent telephone men will dispute that the phenomenal growth and development of Independent telephony has in a large measure been due to the fact that at the time of the early inception of competition in the telephone business Bell service was

rendered much more unsatisfactory than it might otherwise have been by from 60 to 80 per cent. of their subscribers being obliged by reason of exorbitant rates for individual lines to accept party line service.

Exclusive service and the absence of party lines were consequently among the most effective arguments in favor of Independent telephone systems. Not less important, however, were equitable and just treatment to all, and a due regard for reasonable demands by the public.

The immense development of the past few years, and the consequent necessity of economizing cable and pole leads, together with an overwhelming demand from those who desired service, and regarded the matter of price as of greater importance than the character of the service, rendered it necessary for Independent telephone men to seek some method by which every one could be supplied without reducing the price of individual service to an unprofitable figure.

We have observed the result of the serious mistake of the Bell company in trying to force upon the public ten party line and so-called kitchen service, the use of which caused almost universal complaint. While this class of party line service was endured by many persons because of the low rates, the general public demanded something better.

That the modern two- and four-party selective service, as furnished by Independent companies, is extremely popular is proven by the unexampled prosperity of the companies which have adopted it, and the inclination of the Bell people in some of these places to go into the grocery and plumbing business, establish laundry agencies, etc., in a fruitless endeavor to force their patrons engaged in these lines to retain their telephone service.

There is an extensive field for the thoughtful manager, who should carefully forecast the probable requirements of a prospective subscriber, giving due consideration to his business and social circumstances, ascertain the amount and nature of the service he will require, then group those between whom there is likely to be the least friction and interference. If this is wisely done it will meet the hearty approval and commendation of all subscribers, and will redound to the profit of the telephone company.

From the standpoint of the stockholder the party line is desirable because it will reduce the unit cost of a growing volume of business, and increase about twofold the earning capacity of the money invested. For a modern exchange of say 2,000

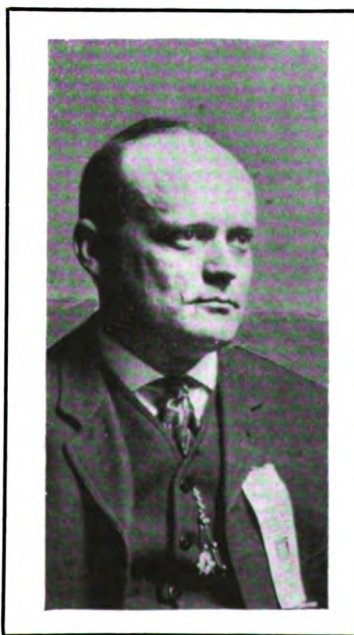
subscribers the average cost of construction should not exceed \$200 per individual line. If for such a plant the residence rate is \$24 per year, the gross earnings would be 12 per cent. of the amount invested. By equipping such a line with four-party service the investment, including four instruments, should not exceed \$230. If a rate of \$15 is charged for four-party service the revenue would be equal to 20 per cent. instead of 12; but as a conservative estimate would place the average number of telephones on a line at three instead of four, this would doubtless in practice be reduced to something over 20 per cent.

How to arrive at a schedule of rates and regulation which will not restrict development, and at the same time yield to the owner a reasonable return for his investment, is a problem, the solution of which is attended by many difficulties.

The rates for farm service in Ohio usually range from \$1 to



W. Gilbert Thompson, President Ohio Telephone Association.



Eugene E. Knox, Secretary Ohio Independent Association.

\$1.50 per month, which, considering the initial investment and the cost of maintenance, yields a smaller return to the stockholder than any other class of service. But for a distance of from five to ten miles from exchanges, where trouble men are at all times available, the service can be profitably handled at those rates; but in most counties there are numerous residents in districts more remote, who are equally anxious for service. Many of these districts are from fifteen to twenty-five miles from an exchange, which renders it very difficult and expensive to handle them. From the company's point of view it would seem that a schedule of rates proportionate to distances should be established; but, unfortunately for the company, the farmer in remote territory is not inclined to accept this solution.

A long discussion of rates and methods followed, and the convention then adjourned till 2:30 p. m.

At the opening of the afternoon session the following committee on permanent organization was appointed:

William L. Cary, Jr., Cleveland, O.

G. P. Thorpe, Wilmington, O.

C. B. Cokefair, Eaton, O.

Morris Taylor, Rochester, O.

The committees appointed at the morning session then reported. The legislative committee recommended the appointment of a committee of three to actively oppose a bill now before the Ohio Legislature, and known as the Eley bill, designed to regulate the price per annum of telephone service.

A paper on "Consolidation" was read by David Prewitt, of Winchester, Ky. We reproduce Mr. Prewitt's paper in part following.

"The era of organization is upon us. How shall we meet it?"

Every Independent interest in America must be indissolubly united in legal bonds.

A fellow citizen is more easily approached for reasonable complaint than is a foreigner; because servants work more faithfully for a master than for another servant, and the relation is more pleasant, and because of a local pride a home company will give better satisfaction to its subscribers locally than will a foreign company. Satisfaction to the subscriber is the *sine quo non* of the telephone business.

Because home management can secure home labor and rights of way most economically; because home management is not so liable to damage suits and unjust taxation, and because home management stands near to the city councils, a home company gives satisfaction to its stockholders.

Because of all these facts, whatever organization we adopt must retain the features of home ownership and management.

But when we have given our subscriber a good local service we have satisfied only a part of his demands. He must have good service with his neighboring towns and cities and with his nearest large city. Telephone companies form themselves in natural groups about these larger cities as centers. For this reason it seems expedient that these groups should first be organized, when the group organization should be organized into a greater organization, which I shall christen "The United Home Telephones of America."

We have five cardinal principles of organization:

1. The possibility of a wilful sale to a hostile interest or of a contract with that interest, unless expedient to the entire Independent interests.

2. The retention of home ownership and local home management.

3. A better organization, including companies most closely related in business ties and a greater organization which will take care of the greater toll business which is not confined to any group and makes of the entire organization one homogeneous whole.

4. A system of representation in the organization which will neither allow the jealousy of the small stockholder nor the greed of the large stockholder undue power.

5. Effective with a small membership and yet capable as necessary demands of being extended over all America.

I wish to call your attention to a plan organizing all toll lines and exchange operating companies. This being effected, the proper legal bonds, with manufacturers may be easily arranged.

The group organization, which I shall christen "The United

States Home Telephones of — District," should accept only such members as are not engaged in any contract which would be denied them as members. Members should be required to bind themselves neither to sell to nor enter into a contract with any telephone person other than a member of the United Home Telephones of America. The compulsory powers of the organization should be a body of delegates, sitting in a lower and upper council. Each company should be represented by a delegate, sitting in both councils. In the upper council he should have a single vote, while in the lower council his vote should be in proportion to the assessed value of the property belonging to the company which he represents. This body should levy necessary taxes, the limit being fixed. The tax levy should originate in the upper council. This body should elect a president, to administer affairs in vacation. No money should be paid out except by vote of the council. A referee should be elected, who would settle all controversies between members.

All district organizations should be members of the United Home Telephones of America. Its powers should be vested in a body of delegates, one from each district. Sitting in the higher council, each delegate should have a single vote, while in the lower council he should have a vote equal to the entire vote in the lower council of his district organization. This body should levy necessary taxes, a limit being fixed. No money should be disbursed except by vote of the council. All appropriations should originate in the upper council. A president and vice-president should be elected by the council. A referee should be elected, who would settle all controversies that might arise between district organizations or between members of different district organizations. The president should appoint, with the consent of the upper council, an advisory board, consisting of a Director of Board of Trade, Director of Patents, Director of Tolls, and such others as may from time to time be advisable. The Director of Board of Trade should arrange to place for the sale of stock and bonds of member companies. The Director of Patents should look after patents, to see that members are not taking liability in infringements, and also to buy any new patents of advantage. The Director of Tolls should establish a clearance house to adjust tolls on messages passing from one district to another. This organization should furnish at a small profit to each member metal plates bearing the copyrighted trade-mark and the words "Member of the U. H. T.," which he shall be required to place on each telephone. This is a very rough outline, but I believe it will stand the test of each of our cardinal principles and adds the features of furnishing practical local and general methods of toll clearances and a crying need of the business, some place where a market may be built up for our securities."

The report of the committee on permanent organization was then read and adopted and on recommendation of the nominating committee the present officers were continued for another year, W. Gilbert Thompson, Lebanon, O., president, and E. E. Knox, Portsmouth, O., secretary and treasurer. The convention then adjourned *sine die*. The next meeting will probably be held at Columbus.

Thursday evening was given over to a "smoker," at which a musical and vaudeville program was given, followed by short entertaining talks by members of the association.

A majority of the delegates left on the night trains, and those who remained till Friday, devoted their time to an inspection of the exhibits.

DELEGATES PRESENT.

Howard Swartz, Star Tel. Co., Ashland, Ky.
 Geo. W. Christian, The Troy Tel. Co., Troy, O.
 C. E. Enrick, The West Milton Home Tel. Co.
 J. W. Chambers, Old Kentucky Tel. & Teleg. Co., Winchester, Ky.
 N. E. Liggett, The Marysville Tel. Co., Marysville, O.
 E. E. Knox, Portsmouth Tel. Co., Portsmouth, O.
 W. Gilbert Thompson, Valley Tel. Co., Lebanon, O.
 Edwin Matthews, Walter Matthews, J. W. Chambers, Maysville Tel. Co., Maysville, Ky.
 Morris Taylor, The Eastern Ohio Tel. Co., East Rochester, O.
 H. L. Corliss, Bracken County Tel. Co., Brooksville, Ky.
 P. S. Pogue, J. A. Armstrong, Louisville Home Tel. Co., Louisville, Ky.
 E. L. Barber, Toledo Home Tel. Co., Toledo, O.
 Jas. S. Brailey, Jr., Central Construction Co., Toledo, O.

Otto Barth, Athens Home Tel. Co., Coolville, O.
 G. V. Lasher, Citizens Tel. Co., Rutland, O.
 C. L. Jones, Athens County Tel. Co., Athens, O.
 W. E. Clark, Amesville Tel. Co., Amesville, O.
 J. H. Bell, Hoosier Tel. Co., Salem, Ind.
 F. S. Chapman, Kenton Tel. Co., Kenton, O.
 Edwin Fledrjohann, Logan Home Tel. Co., Logan, O.
 Walter Green, Independent Tel. Traffic Co., Cleveland, O.
 H. E. Barnet, Official Stenographer of the Convention, Cincinnati, O.
 L. M. Flesh, Piqua Home Tel. Co., Piqua, O.
 A. S. Doudna, The Belmont Tel. Co., Bridgeport, O.
 C. H. Marvin, The Urbana Tel. Co., Urbana, O.
 Cal Liggett, Secy., Home Tel. Co., Plain City, O.
 W. H. Baum, Citizens Tel. Co., Batavia, O.
 S. G. Gilbert, Jackson County Home Tel. Co., Jackson, O.
 S. C. Kissner, Citizens Tel. Co. and Farmers & Merchants Tel. Co., Coshocton, O.
 O. F. French, The Cuyahoga Tel. Co., Cleveland, O.
 A. S. Hillhouse, Stark County Tel. Co., Canton, O.
 W. B. Overly, United States Tel. Co., Cleveland, O.
 C. G. McVey, Federal Tel. Co., Cleveland, O.
 W. J. Halloway, Massillon Tel. Co., Massillon, O.
 W. F. Crossley, The Columbiana County Tel. Co., The Youngstown Tel. Co., Youngstown, O.
 G. W. Vernon, Findlay Home Tel. Co., Wood County Tel. Co., Findlay, O.
 O. G. Snyder, Bluffton Tel. Co., Bluffton, O.
 Jas. B. Hoge, Federal Tel. Co., Cleveland, O.
 J. B. Rhodes, The Zanesville Tel. & Tel. Co., Zanesville, O.
 W. J. Reisinger, The Gallipolis Tel. Co., Gallipolis, O.
 Frank L. Beam, Columbus Citizens Tel. Co., Columbus, O.
 Max Reber, Kinloch Telephone Co., St. Louis, Mo.
 J. H. Thedick, Sidney Tel. Co., Sidney, O.
 H. L. Beatty, The Portage County Tel. Co., Ravenna, O.
 Geo. H. Metheany, The Lima Tel. & Teleg. Co., Lima, O.
 J. S. Stewart, T. J. Stewart, Loren Brubaker, Southwestern Tel. Co. Gratis, O.
 N. Yenrick, Lancaster, O.
 William R. Fee, Milford, O.
 J. C. Rhodes, The Citizens Tel. & Message Co., Fostoria, O.
 C. D. Juvenal, The Springfield & Xenia Tel. Co.
 A. R. Crawford, Hamilton Home Tel. Co.
 W. L. Cary, Jr., Federal Tel. Co., Cleveland, O.
 Harry B. Gates, Queen City Tel. Co., Cincinnati, O.
 J. W. Hutchinson, The Oxford Tel. Co., Oxford, O.
 D. L. Clark, Secy., The St. Mary's Tel. Co., St. Mary's, O.
 B. W. Pickering, The Union Tel. Co., Gloucester, Athens Co., O.
 L. M. Studevant, Andrew Hess, Sidney Tel. Co., Sidney, O.
 Geo. S. Shanklin, Fayette Home Tel. Co., Lexington, Ky.
 C. B. Cokefair, Eaton Tel. Co., Camden Tel. Co., Eaton, O.
 W. H. Brubaker, The West Alexandria Tel. Co., West Alexandria, O.
 O. O. Zehring, The Germantown Ind. Tel. Co.
 David Prewitt, Old Kentucky Tel. & Tel. Co., Winchester, Ky.
 John C. Shirk, The Brookville Tel. Co., Brookville, Ind.
 G. A. Hogue, Greenwood Tel. Co., Greenwood, Ind.
 G. P. Thorpe, The Clinton Tel. Co., Wilmington, O.
 O. M. Bake, Hamilton Home Tel. Co., Ohio Valley Tel. Co., Dartown Tel. Co., Morning Sun Tel. Co., Hamilton, O.
 G. Lowe, Valley Tel. Co., Mason, O.
 M. L. Sternberger, Jackson County Tel. Co., Jackson, O.
 James Stoops, Valley Tel. Co., Waynesville, O.
 H. P. Morrow, The Hillsboro Tel. Co., Hillsboro, O.

MANUFACTURERS AND SUPPLY HOUSES REPRESENTED.

Automatic Electric Co., Chicago; J. F. Crook.
 American Electric Telephone Co., Chicago; P. J. Eubanks.
 American Electric Fuse Co., Chicago; J. E. Kenny.
 American Steel & Wire Co., Chicago; Geo. Chandler.
 American Electrical Works, Chicago; E. H. Hammond.
 F. Bissell Co., Toledo, O.; F. M. Knierim.
 Barry & Benton, Chicago; F. H. Barry.
 Chicago Writing Machine Co., Chicago; F. W. Pardee.

Creaghead Engineering Co., Cincinnati, O.; P. J. Creaghead and J. H. Creaghead.

W. W. Dean Electric Co., Elyria, O.; A. E. Barker.
 The Elmore-Fowler-Jacobs Co., Chicago; S. H. Campbell.
 The Erner-Hopkins Co., Columbus, O.; W. H. Hopkins, Jr.
 Eureka Electric Co., Chicago; Herbert Rosenow.
 Hipwell Mfg. Co., Allegheny, Pa.; H. H. Hipwell.
 Kellogg Switchboard & Supply Co., Chicago; A. B. Kratz and G. H. Lutz.
 Stromberg-Carlson Telephone Mfg. Co., Chicago; Geo. H. Fister and R. B. Tyler.

Swedish-American Telephone Co., Chicago; E. B. Overshiner and C. H. Macklin.

Sterling Electric Co., Lafayette, Ind.; W. E. Doolittle and Fred E. Freers.

Standard Underground Cable Co., Chicago; Arthur A. Anderson.
 J. A. Roebing's Sons Co., Cleveland, O.; M. P. Bowman and W. W. Affleck.

Post-Glover Electric Co., Cincinnati, O.; S. W. Glover.

Miller Anchor Co., Norwalk, O.; G. H. Miller.

Monarch Telephone Mfg. Co., Chicago; W. H. Trimm.

W. G. Nagel Electric Co., Toledo, O.; E. J. Paradis.

North Electric Co., Cleveland, O.; Geo. B. Pratt.

Sebastian-Leicht Mfg. Co., Ashland, Ky.; G. W. Sebastian.

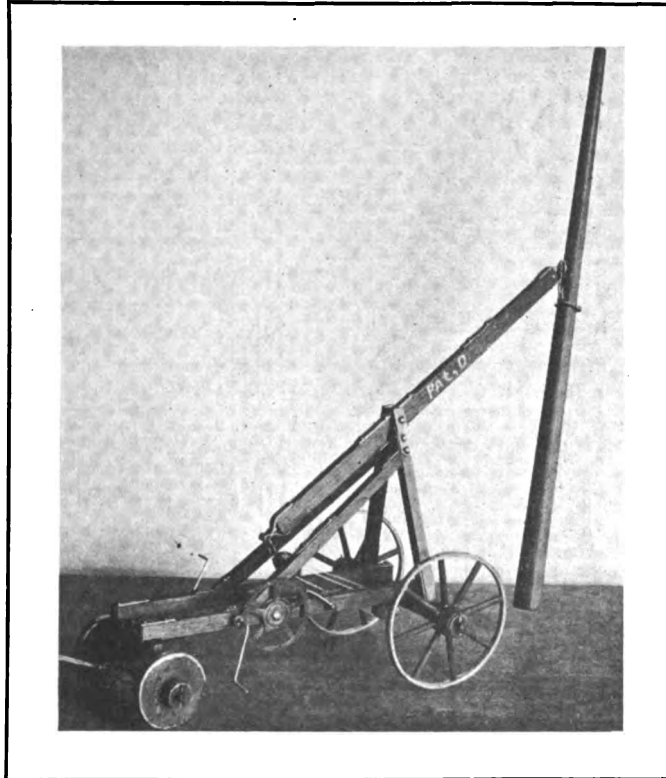
Indianapolis Bracket & Pin Co., Madison, Ind.; J. B. Magers.

McRoy Clay Works, Chicago; E. F. Kirkpatrick.

Illinois Specialty Co., Chicago; J. C. Hertz.

A SIMPLE POLE-RAISING DERRICK.

THE accompanying photograph shows a pole-raising derrick which was designed by Frank D. Byler, a blacksmith, of Morgantown, Pennsylvania. The machine shown is a model of the type used to raise poles of lengths from 25 to 50 feet. In a machine designed to raise longer poles the upright braces

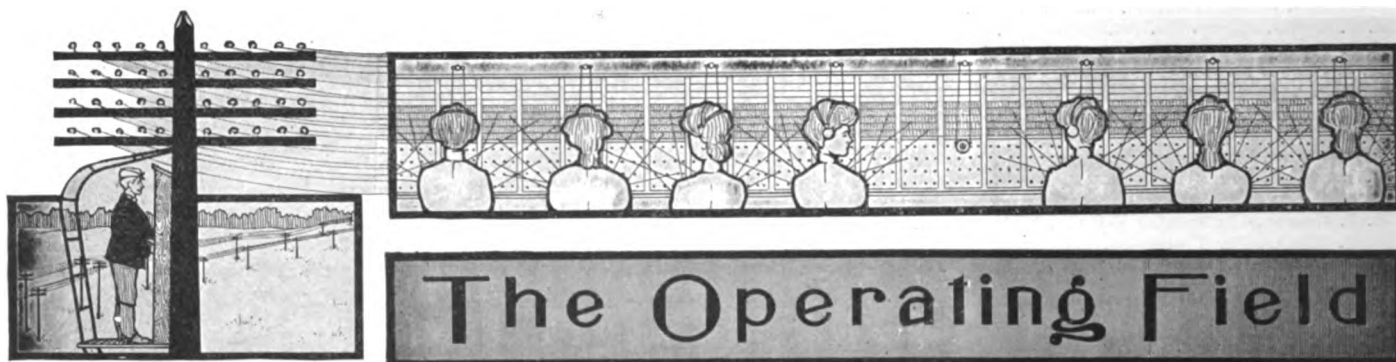


A Pole Raising Derrick.

are set 3 feet in front of the rear axle and some sort of a power appliance, such as a gasoline engine or electric motor, is placed on the front to raise the pole, instead of the winch, which is shown in the photograph. The clamp which is used to hold the pole will grip the pole automatically, and loosen itself when the pole is set in the hole. When it is required to take a pole from the hole, the grip will tighten of itself and the pole can be easily extracted. Mr. Byler has taken out a patent on his contrivance.

PARISIAN TELEPHONES.

A REPORT has been issued by Mr. Marcel Lembat, a member of the Chamber of Deputies, on the postal telegraph and telephone services in France during 1903, a very interesting portion of which deals with what is called the telephone crisis in Paris. Mr. Lembat notes that the subscription rate in that city is £16, which is equivalent to \$80.00, per annum, and although the administration promised to reduce this rate to £12, which is equivalent to \$60.00, nothing has been done in the matter. For the present rate an unlimited number of conversations is allowed within the Paris area proper, which embraces 48 exchanges. There were in the city on October 31, 1902, total connections to the number of 40,555, or only 1.49 connections for every 100 inhabitants, this being much lower than the average for other European cities or in America. The apparatus, with the exception of the batteries, has to be supplied by the subscribers at their own cost, but the maintenance is at the cost of the State. The patronage of the system is not extensive, as it appears that the daily use of the instrument does not reach above five conversations on the part of 53 per cent. of the subscribers, while less than 9 per cent. use the telephone more than 15 times a day.



IOWA ASSOCIATION MEETING.

constructed a telephone apparatus. This hangs from his shoulders, and as he goes up he pays out a coil 1,700 feet long. The end is attached to an apparatus on the earth, and so Mr. Cody sits 1,600 feet high and converses with those on solid earth.

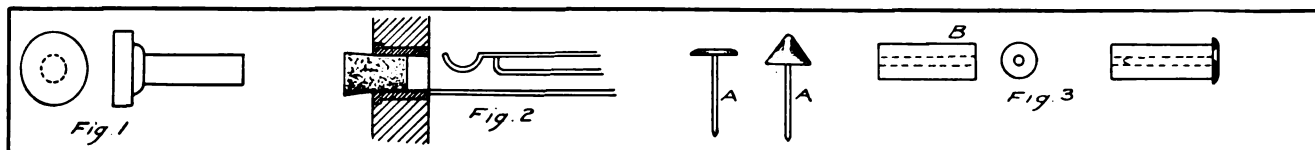
TELEPHONE BILL IN VIRGINIA KILLED.

THE Duke-Phlegar telephone bill, which was introduced in the Virginia legislature, requiring the transmission of messages from one company over the lines of another, has been abandoned. The bill has been before the committees of the Senate for some time. Its abandonment does not mean that the agitation is dead, but merely that its friends are going to prepare another measure which will meet the objections urged against it. It is understood that Senator Phlegar, Mr. Duke and others will draw a new bill.

THE USE OF INDICATING PLUGS.

By C. L. Howk.

THE use of plugs inserted in line jacks to indicate to the operators irregular conditions of lines, has been adopted by practically all exchanges. By their use, telephones discontinued, out of order, etc., can be called to the operator's attention when she starts to make a connection with such a line.



It also saves the placing lists of lines in such conditions on the face of the board. Fig. 1 shows the ordinary plug used for the purpose. It is made of wood fiber or pressed paper and can be obtained in different colors to indicate different conditions. A red one could be used to indicate discontinued lines, a green one for lines temporarily out of order, a blue one for a poor paying subscriber, who needs to be without service, "by cashier's orders," to call his attention to an unpaid bill, a black one where there is sickness, and the subscriber is not to be called unless urgent, a white one on which is printed the number to which the telephone has been changed, and so on. Small exchanges can use these plugs to good advantage as well as large ones, while two or three different styles will be all that are required. Where only a small number of those plugs are required, a cork, colored suitably can be used. Most drug stores keep them, but corks have the serious objection of clipping off and finally getting pushed into the jack. The corks used should be larger than the jack and placed as Fig. 2.

A cheap and substantial substitute can be used as Fig. 3. *A*, a common gilt upholstery nail and *B* a cylinder of wood the size of the jack, and about $\frac{5}{8}$ of an inch in length. The wood can be obtained in pieces several feet long from any cabinet maker who uses them for dowel pins. It can be easily cut in sections of the required length with a knife. It may be necessary to drill a hole for the nail to avoid splitting. The round headed ones are used for telephones discontinued, and the pointed ones are placed in those lines which are out of order. This is done by the chief operator and they are so placed by the wire chief's orders. Where a line is O K, the plug is removed, thus calling on unavailable lines is avoided. There are other uses which will occur to any manager and will make operating easier.

YORK STATE TOLL LINE COMPLETED.

THE York State Telephone line from Binghamton to Elmira has been completed. This connection, together with the connections recently made to Penn Yan, Geneva, Canandaigua, Lockport, Batavia, Buffalo, Tonawanda, Niagara Falls, Hornellsville, Wellsville, Salamanca, Jamestown, Waverly, Tonawanda, Tunkhannock, Scranton and Wilkesbarre and all intermediate points, gives the York State Company excellent long service in the vicinity of Elmira and Binghamton. In the near future lines already built, will be perfected to Albany, Troy, Saratoga, Johnstown, N. Y., Philadelphia and Pittsburg, Pa.,

Camden, Trenton and Atlantic City, N. J., and through all parts of New York, Pennsylvania, New Jersey, Maryland, Virginia, West Virginia, Ohio, Indiana, Illinois and Michigan.

EXCHANGE BURNT AT REED CITY, MICH.

FIRE visited the Reed City, Mich., exchange of the Citizens' Telephone Company, but before too much headway was gained the switchboard was removed. The terminals were rendered useless. The smoke of the fire had not yet cleared away when Manager Marshall had five telephone men from Grand Rapids putting the exchange into operation, and in view of the fact that practically a new exchange had to be built some extraordinary work was done.

TELEPHONIC LOSSES IN BALTIMORE FIRE.

IT is estimated that the Chesapeake and Potomac Telephone Company lost over 1,500 telephones, besides many hundred miles of wires and cables in the fire. The Maryland company lost but little wire, as the service is for the most part underground. General Manager Webb, of the Maryland, said yesterday that his company had lost 700 telephones. None of the Maryland stations were injured by the fire. The Chesapeake company suffered its heaviest loss in the destruction of the St. Paul ex-

change. With it went the practically new switchboard, which was valued in the neighborhood of \$50,000. Some of the destroyed pay station telephones were filled with nickels and dimes.

A BANQUET BY TELEPHONE.

THE members of the Alumni Association of Washington University held two banquets simultaneously at the St. Nicholas Hotel, St. Louis, and the Chicago Athletic Club, Chicago, recently. Eighty receivers and three transmitters were arranged on the banquet tables in St. Louis and also in Chicago. William S. Curtis delivered the opening toast in St. Louis, and it was responded to by Grant Beebe in Chicago. The silence was broken frequently by applause. Toasts followed alternately in St. Louis and Chicago.

ONE WAY TO INSTALL UNDERGROUND DUCT.

A WAY to lay wires and small pipes under paved streets has been found by Chief Harding, of Bay City, Mich. It was necessary to cross a certain street in that town to connect the telephone wires to complete the fire alarm service in the district where it is underground, says the *Municipal Journal and Engineer*. To dig up the pavement would cost considerable and at the time might run the risk of ruining the paving, as it is almost impossible to repair a hole in a pavement and have it as good as when first laid. The chief had a sharp point filed on a piece of three-inch iron gas pipe, to which was fastened five feet of two-inch pipe. Starting in a trench on one side of the street, a powerful jack forced the pipe into the earth. Inch by inch the pipe was forced across the street and came out within a few inches of the place desired. It took about five hours to cross the street, which was of usual width.

UNLAWFUL TO SWEAR OVER THE TELEPHONE.

DAVID TUSKA, a wealthy turfman, swore at and threatened to whip a telephone operator at Indiana Harbor, in Lake County, Indiana, and was in turn arrested upon a charge of profanity. The trouble arose over a double charge of a toll call to which Tuska objected in language forbidden by the Indiana statute. The trial lasted four hours and was bitterly contested. Judge Reiland held that swearing over the telephone was prohibited by statute and punishable, and thereupon assessed a fine against the defendant.



THE POSTMASTER GENERAL'S MISTAKE.

INDEPENDENT telephone operators throughout the country are waiting with more or less patience to ascertain if President Roosevelt will uphold his Postmaster-General's active hostility to the Independent telephone interests throughout the country. It is inconceivable to think that a man with the President's reputation for honesty and fairness will sustain such a department ruling if a proper investigation of the facts is made.

In the notorious order referred to, the Bell monopoly has certainly broken out in a new spot. That the Government of the United States should lend itself to help the Bell interests in their losing fight is certainly an unexpected state of affairs, even to those familiar with Bell methods. It happens, however, that Postmaster-General Payne of President Roosevelt's cabinet was at one time an official of the Wisconsin Telephone Company, a Bell concern, and presumably is now a stockholder. His sympathies, if not his personal interests, are all with the Bell people.

Accordingly he has sought to turn over the entire postal system of the United States to the Bell monopoly by refusing to install Independent telephones in the postoffices. In some instances he has gone farther than this and refuses to permit the use of an Independent telephone, even although the postmaster desires to install one as a convenience to the people without cost to the Government.

Postmaster-General Payne is not the first public official to make the mistake of thinking himself the people. His excuse for thus furthering the Bell interests is fair on the surface. He says: "The theory on which these telephones (Bell) are installed is service to the Government. There is no other reason for the outlay." The reference is to the fact that only the Bell lines run into Washington.

"Service to the government" sounds well, but what does it mean? If it means service to the government clerks at Washington, including the Postmaster-General, there is no excuse for the outlay, absolutely no reason for installing either a Bell or an Independent telephone. The District of Columbia is monopolized by the Bell Company and there the telephone plays an important part in the economy of the Department.

Mr. Payne is not in the habit of issuing orders to distant postmasters by telephone and it is doubtful if one of them ever had telephonic connection with Washington. It would no doubt be a courteous thing for the thousands of postmasters in the West, the East and the South to call up the Postmaster-General each morning and solicitously inquire after his health, but the fact remains that this is not done. Postoffice telephones are not used by the authorities at Washington.

"Service to the government" evidently does not mean service to the Postmaster-General, except, of course, as he may be peculiarly interested in the Bell monopoly. The phrase must therefore mean service to the postmasters or service to the people who constitute the government, or both. But the postmasters have no occasion to telephone the Department at Washington. Their only use for a telephone is to communicate with the patrons of the postoffice; that is, the people, who will be doing business at the old stand long after Postmaster-General Payne has been forgotten. In other words, a telephone in a public postoffice is for the con-

HIS RECENT ORDER A MOST UNJUST ONE.

venience of the public and for nothing else, which is precisely the reason the postoffice department itself has for existing. Now, if Mr. Payne wishes to consult the convenience of the

people he must not let the interests of the Bell monopoly bound his mental horizon. The Bell telephone is undeniably an important factor in the commercial and social life of the nation. It would be manifestly unjust for the government to issue an order restricting postoffices to the use of Independent telephones, for a large number of people would be inconvenienced thereby. Even Mr. Payne will admit that. But there is a fact that Mr. Payne has either overlooked or ignored. More than half the people who use telephones at all use Independent telephones.

There are rural companies all over the country, miles away from a Bell instrument. There are larger Independent systems, some covering single counties and others many counties. They actually have more telephones in use than have the Bell companies. How about them? The users of these telephones pay taxes for the support of the government of which they are a part; they are patrons and supporters of the postoffices; they are voters. Is not their convenience to be consulted also? What must we think of a Postmaster-General who uses his great power to inconvenience more than two million families and firms on the plea of "service to the government"?

Senator Hanna, on whom the Independents were relying to use his influence to right this wrong, is unfortunately no longer with us. But justice remains and a President remains whom no one believes will consciously uphold a wrong. There can be but one excuse for installing a telephone of any kind in a postoffice, and that is for the convenience of the postmaster and the people, which does not mean the convenience of only those people who happen to use Bell telephones.

Looked at in this light the telephone in the postoffice has a great future. Its use should be encouraged rather than restricted. In the rural districts especially, where the people live miles from the postoffice, a telephone is invaluable, not as an assistance to the Postmaster-General, but as a convenience to the postoffice patrons. The Postmaster-General himself in his annual report has recommended a greater use of the telephone. He is even reported as advocating that, when desired, postmasters should be instructed to apprise farmers living at a distance of the contents of their letters. This is not a bad idea, but in carrying it into execution Mr. Payne would find that most of these farmers have Independent telephones and under the present ruling would have no way of connecting with the postoffice.

This whole unsavory business shows to what lengths the Bell people will go in their efforts to stifle competition and retain their hold on the public. Whether it is influencing a cabinet official or masquerading as an Independent manufacturer, like the Kellogg concern, the Bell people never lose an opportunity to trick the Independent companies if possible. So far, however, the Independents have readily seen through their tricks. This unjust order of the Postmaster-General will not long stand, and already is the Kellogg Company feeling the effect of a general refusal on the part of Independent operators to lend themselves to further any tricks or plans of their Bell adversaries.



Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

RIGHT OF TELEPHONE LINE TO CROSS RAILROAD TRACK.

A TELEPHONE company in Indiana wishes to construct a line across the right of way and tracks of a railroad company. It does not intend to erect poles upon the right of way but merely to extend a single wire across the right of way at right angles to it, the poles standing in the highway on either side of the right of way and clear of it. The railroad company demands that the telephone company enter into an agreement with it and build the line under a license from the railroad company, one provision in the contract to be that the wire shall be removed by the telephone company upon thirty days' notice from the railroad company. The statutes of the State provide that wires over a steam railroad shall be supported by good substantial poles of a size not less than twelve inches in diameter at the bottom and not less than six inches in diameter at the top, such poles to set in the earth not less than six feet and to be well tamped. All such wires shall clear the top of the rails of such a steam road at least twenty-five feet and be securely fastened to said poles. Penalties for non-compliance are provided. Burn's Rev. Stat. sec. 5516A, 5516B and 5516C. Is the permission of the railroad company necessary before the telephone company can stretch its wire across the right of way?

There are telegraph wires belonging to the railroad company along the right of way. The company requires that the telephone company put guard wires both above and below its wire. The telephone company uses a single cross arm but the company asks it to use double cross arms at the crossing. Can it insist on these precautions? Are they advisable?

S. COUNTY TELEPH. CO.

THE permission of the railroad company is not necessary and it cannot demand that you enter into a contract with it before crossing its track at the point described. The highway crosses the right of way and whoever has the right to use the highway at other points has a right to use it where it crosses the right of way. A telephone line is not an additional servitude upon the highway in Indiana. *Magee vs. Overshiner*, 150 Ind. 127, 49 N. E. 951, 40 L. R. A. 370. You therefore have the right to cross the tracks at the point named without the railroad company's permission, although it might be otherwise if there were no crossing. This right is recognized by the statutes providing how the crossing shall be made.

The railroad company has no right to insist upon your using a double instead of a single crossarm, unless it can show that the use of a single crossarm would be dangerous in the circumstances. This I do not believe it can do.

It has often been held the duty of telephone and other electric companies to maintain guard wires to prevent interference with wires of other companies. *McKay vs. Southern Bell Teleph. Co.*, 111 Ala. 337; 19 S. 695; 31 L. R. A. 589; *State vs. Janesville Ry. Co.*, 87 Wis. 72, 41 Am. St. Rep. 23; *Central Penn. Teleph. Co. vs. Ry. Co.*, 11 Penn. Co. Ct. Rep. 417, 4 Am. Elec. Cas. 260; *Jones on Electric Law*, Sec. 517 a. I believe the railroad company is right in asking you to erect guard wires because you are the later comer. If you failed to do so and trouble occurred, you might be held liable.

TAXES ON POLES HELD VOID.

THE Supreme Court of the United States in two recent cases has passed upon the validity of ordinances imposing license fees upon electric companies engaged in interstate commerce. Both cases reverse the judgment of the Supreme Court of Pennsylvania and hold the ordinances invalid. The cases are those of the *Postal Telegraph-Cable Company vs. the Boroughs of New Hope and Taylor*, respectively.

In the first case the license fee was \$1 for each pole and \$2.50 for each mile of wire used in the borough by the company, the license to be applied for and the fee to be paid annually. The company refused to pay and was sued by the borough. An affidavit of defense was made by the company in which, among other allegations, it set up that the amount of the tax was wholly disproportionate to the usual and necessary expense of inspecting and supervising imposed on the borough, and also in excess of any liability that might arise by reason of injuries to persons or property therefrom. It further stated that the charges were more than ten times the amount of all kinds of expenses which might have been incurred by the borough by reason of the poles and wires and that the assessing of the license tax upon the company was for the purpose of raising revenue and therefore void. On the trial in the lower court the company proved that the only work done upon the poles and wires by employees of the borough was the counting and assessing of the poles. It proved that the claim of the borough amounted to 17 per cent. of the cost of the line in the borough.

The trial judge submitted the question of reasonableness to a jury under an instruction to find the full amount claimed if it thought the ordinance reasonable. The jury returned a verdict for less than the amount claimed and judgment was given accordingly. This judgment was affirmed by the superior and supreme court of Pennsylvania. The Supreme Court of the United States reversed this judgment. It held that the verdict of the jury, in finding less than was claimed by the borough, amounted to a determination that the ordinance was unreasonable, since the jury could not itself assess a tax and render judgment for what it considered reasonable. The ordinance was held void.

The second case was similar to the first. The company averred in its affidavit of defense that it had no office and transacted no business in the borough; that the borough was a sparsely populated coal mining community; that the buildings consisted chiefly of miners' cabins; that the poles were located on the side of a highway which was little travelled. It further alleged that if every borough in the State in which the company had its system imposed a similar tax it would amount to over \$100,000 per annum and that the company would become insolvent if it had to pay such an amount. The borough excepted to this affidavit of defense on the ground that it did not state any sufficient defense and also on the ground of *res judicata*, in that the same questions had been previously decided between the same parties in the courts of the State. To the latter contention the court replied that it appeared that the case was not decided upon any ground of *res judicata* in the State court. It then held the tax unjustifiable and the ordinance void. In his opinion Mr. Justice Peckham said:

To uphold it (the ordinance) in such a case as this is to say that it may be passed for one purpose and used for another; passed as a police inspection measure and used for the purpose of raising revenue; that the enactment as a police measure may be used as a mere subterfuge for the purpose of raising revenue, and yet, because it is said to be an inspection measure, the court must take it as such and hold it valid, although resulting in a rate of taxation which, if carried out throughout the country, would bankrupt the company were it added to the other taxes properly assessed for revenue and paid by the company.

Postal Telegraph Cable Co. vs. New Hope, Advance Opinions (L. ed.) No. 5, p. 205. Ditto vs. Taylor, Ibid. p. 208.

TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION*

II.—THE NATURE OF THE TRANSMISSION AND THE MANNER IN WHICH ENERGY IS DISTRIBUTED.

THE simplest conception of a transmission line is that of a reservoir of energy filled and emptied at an enormous velocity. The energy which may be stored in a transmission line of ordinary length, to which a commercial electromotive force is applied and which is traversed by currents of ordinary strength, is exceedingly small and would be of the magnitude of a few foot-pounds. Such a line operates, however, at a velocity slightly less than that of light—the velocity of light being 186,000 miles per second. The velocity of propagation of free electromagnetic waves in the ether is the same as the velocity of light and light is itself an electromagnetic phenomenon. It will be seen in a moment that the function of the wire or wires of a transmission line is merely that of a guide and not that of transmitting the energy.

Considering the four properties of a transmission line, it will be seen that of the energy delivered to the line there are four components in its distribution. The relative values of these components among themselves are determined by the relative values of the four properties of the line, and by the frequency. This is almost exactly true of very long lines, but is modified in short lines where the reaction of the terminal apparatus is greater compared with the line reactions. The ohmic resistance causes a drop in electromotive force along the line and determines the energy lost in heating the conductor, which is commonly called the $I^2 R$ loss. This energy is lost and appears as heat, elevating the temperature of the wire slightly and radiating to the atmosphere. The currents which flow through the leakage paths result in a loss of energy, heating those paths and likewise dissipating the energy into the atmosphere. The resistance reaction and the leakage reaction of a line are termed "dissipative" because the energy expended cannot be recovered.

The establishment of the magnetic field about the line when a current is made to traverse the line longitudinally, results in the storage of energy in this field. The reaction due to the magnetic field appears as a retarding electromotive force in the circuit when the current is established and as a prolonging electromotive force when the current vanishes—that is, the effect of the magnetic field on a change in the current strength in the line is analogous to the effect of inertia on a change of motion. A steady direct current through a circuit possessing a magnetic field is analogous to the uniform motion of a body.

* A paper read at the annual convention of the Association of Railway Telegraph Superintendents.

Any change in the rate of motion or the speed of a body is opposed by the inertia. This opposition is apparent in the force equal and opposite to the impressed force causing the change in the motion. The energy delivered from the circuit to the magnetic field is returned by the field to the circuit when the energizing current is interrupted or made to vanish. The energy stored in the magnetic field, due to a circuit of inductance " L " traversed by a steady direct current " I ", is $\frac{1}{2} LI^2$. Of this energy a very large percentage is stored in the dielectric about the wire.

The last component of line energy is that stored in the static charge of the line. This energy, as explained before, is stored in the dielectric about the line. It is necessary, in order to raise the potential of the distant end of the line, to charge the whole intervening line and consequently there is an expenditure of energy. This energy is returned to the line from the dielectric when the impressed electromotive force is removed from the line. The energy expended in charging the static field is $\frac{1}{2} C V^2$, where C is the total capacity and V is the electromotive force impressed on the line.

The reactions due to the magnetic field and to the static field are termed "non-dissipative," because in a complete cycle of operations—that is, in the establishment and removal of an electromotive force, or in the establishment and removal of a current—the total expenditure of energy in the fields is zero. Therefore, to summarize: energy is expended in the line in overcoming the line drop, the back electromotive force of self-induction, supplying the advance current to charge the static field and in supplying the leakage current, the latter being in general negligible except under the conditions noted above.

It will be seen from a consideration of these four reactions that the line of greatest efficiency is the one whose magnetic reaction predominates over the other reactions. Evidently, the dissipative reactions should be made a minimum. The capacity reaction, while not dissipative, is not directly a factor in transmitting energy, because the charging current which establishes the static field is transverse with respect to the line, rather than longitudinal. The magnetic reaction, however, while it retards the establishment of a line current, tends to prolong that current circuitally through the line and a magnetic reaction, great compared to the other three reactions, results in a circuital line current of maximum transmitted energy.

(To be continued.)

OWENSBORO, KENTUCKY, COMPANY INCREASES ITS CAPACITY

THE Home Telephone Company, of Owensboro, Ky., is preparing to install exchange equipment which will increase its capacity by about 50 per cent. The present switchboard will be retained as it is at present, and the new apparatus will be added to it. The addition will mean that the exchange can accommodate 500 more telephones than at present. The contract will call also for about 20,000 feet of aerial and subterranean cable for outside extension and construction of some new lines. All of the work will be done according to the latest and most approved ideas of telephone construction.

Manager Cole, of the Home company, said that the company had not contemplated any addition to the equipment this year; that when the present switchboard was installed it was thought that its capacity would not be taxed for a number of years. For

several months past, however, parties wanting telephones could be accommodated only as old subscribers dropped out. A "waiting list" has been kept and has grown steadily until it became absolutely necessary to make some kind of arrangement for their accommodation.

In a few months Independent telephone companies will have completed lines in the South which will give the Owensboro company connection in that direction equal to those North and East. Lines are now under construction which will connect Owensboro with Clarksville, Jackson and Memphis, Tenn., and Columbus and other towns in Mississippi. Connection with St. Louis has already been established. Chicago is constructing an Independent exchange and the Independent companies are spreading in other directions. The new equipment will be Stromberg Carlson.

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.

AN INSTRUCTION CIRCUIT.—(287.)

Can you give me a wiring diagram of the circuit known as the instruction circuit, and also particulars regarding its use? F. R. O.

The instruction circuit (Fig. 287) is a connecting circuit between the operators at the switchboard and the monitor operator, chief operator or manager as the circumstances of the case may require. It is usual to assign one of the calling circuit buttons at each operator's position, for use as the instruction cir-

There is nothing essentially gained in cutting the ringers out of circuit as you describe, and your explanation that they are wired in this way from force of habit may be very largely credited. Theoretically, when a ringer is bridged across the circuit it shunts a small portion of the talking current, but when the ringers are wound to a thousand ohms or over this is such an infinitesimal fraction as to be entirely unnoticeable in practice. We doubt very much whether at the present time any of the manufacturing com-

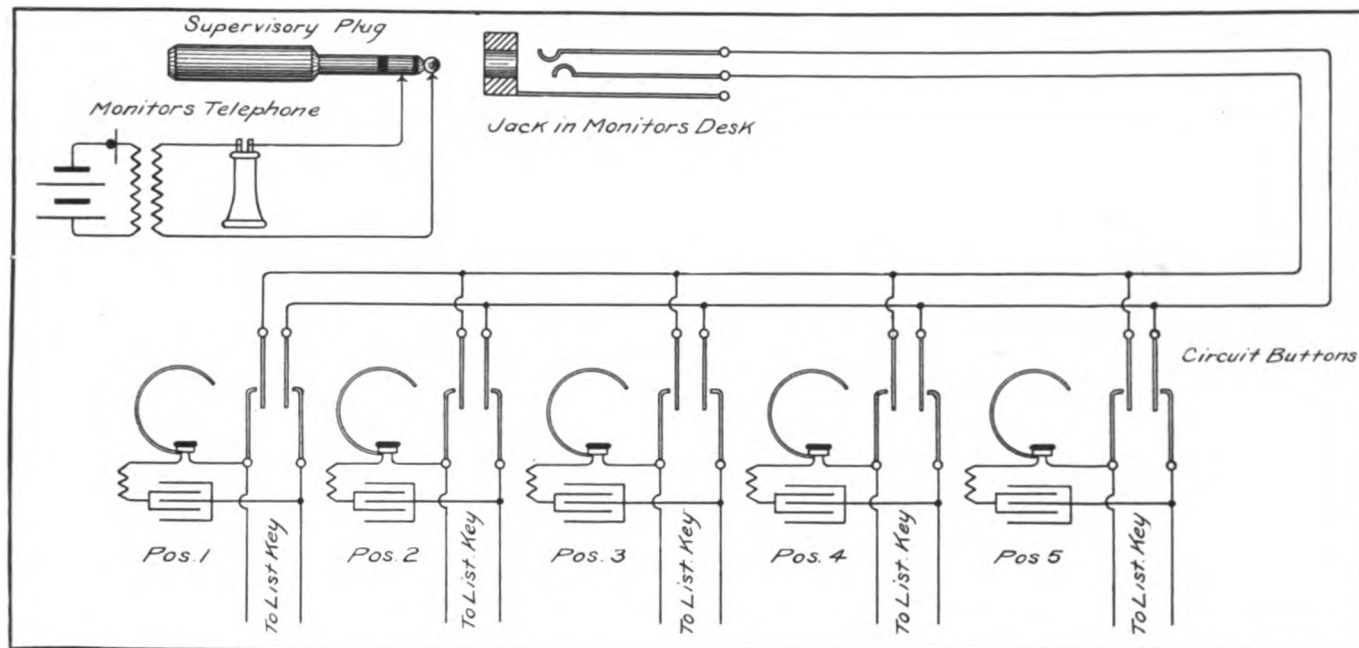


Figure 287.

cuit button, and to connect these buttons in multiple throughout the board, terminating the connecting pair at a jack on the monitor, chief operator's or manager's desk. Each desk telephone set is provided with a two conductor plug and flexible cord, the cord being connected across the secondary circuit, as shown in the accompanying diagram. In addition, a push button is furnished at the desk, the depression of which serves to ring a large bell so located that it may be heard by every operator at the board. When it is desired to communicate with all the operators at once, the supervising plug is inserted in the jack and the push button depressed, thus ringing the bell. At this signal all the operators should depress the instruction circuit button at their positions and thus con-

panies are putting out instruments with the lower contact such as you describe. The ringers are left permanently bridged across the line.

CURRENT TO AFFECT RECEIVER.—(289.)

Will you tell me what amount of current can flow through a telephone receiver without making an audible sound in it? G. C.

Experiments which have been made to determine the permissible current in a telephone receiver at commercial frequencies, which will not interfere with telephonic transmission, show that a current of approximately 5×10^{-8} ampere is permissible. This will vary slightly with the frequency of the distributing current, its wave form and the sensitiveness of the telephone employed.

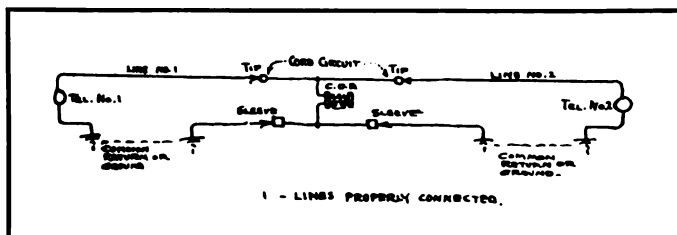


Figure 283a.

nect themselves to the line and receive such instructions as it may be desired to transmit. The accompanying diagram shows the general arrangement of the circuit.

BRIDGED RINGERS.—(288.)

Where the ringers of a telephone are of 1,000 ohms resistance, or over, it would simplify the wiring to have them permanently bridged across; moreover it would eliminate a point of possible "trouble" by doing away with one contact in the switch-hook. I wish to know if there is (practically) anything gained by cutting out the ringers in such instruments when the talking circuit is in use, or are they wired that way simply from force of habit? O. S. V.

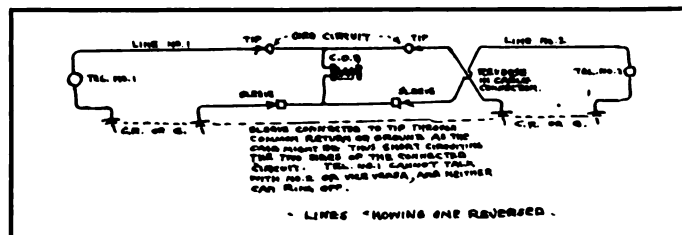


Figure 283b.

AMENDMENT TO QUERY 283.

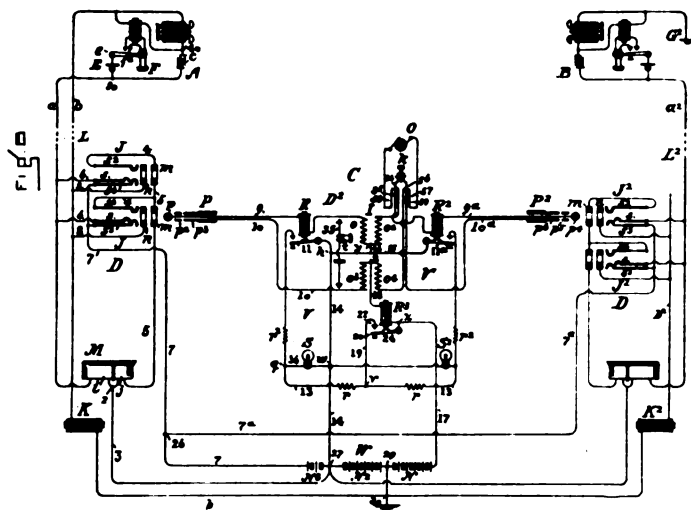
Ray H. Manson, of the Dean Electric Company, of Elyria, Ohio, suggests the following amendment to Query 283 and sends us Figures 283a and 283b to illustrate his idea:

"If part of the subscribers' lines going into the common return exchange were reversed with respect to the tip and sleeve side of the line jack, then upon connecting one of these lines to a correctly connected line a short circuit will result as shown in Figure 283a."

PATENTS ISSUED

SYSTEM FOR CONVERTING BRANCH - TERMINAL SWITCHBOARDS INTO COMMON BATTERY BOARDS.

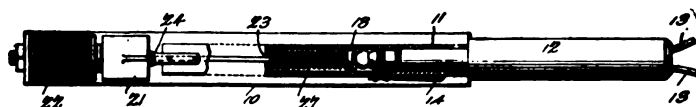
Malcolm C. Rorty, Dedham, Massachusetts, patents (No. 750,704) and assigns to the American Telephone and Telegraph Company an improved method of changing branch-terminal switchboards to common battery boards. The object of this invention is to enable the circuit of existing branch-terminal boards to be



changed to common battery without excessive expense. The circuit is shown in the figure. The inventor provides a common battery sub-divided into three parts, N , N_2 , N_3 . Each subscriber's station is changed to the usual common battery circuit, as at A and B . At the central office an impedance coil K is introduced in the conductor (b). The third wire in the cord circuit is removed, leaving the plug to connect the rings (m) and (n) of each jack. The third wire in the switchboard is extended to battery (N_3) and to the long springs s' , s'' . The cord circuit is supplied with three supervisory relays, R_1 , R_2 and R_3 . The operation is as follows: When the receiver is removed, the battery flows through the signal winding of the drop M . This displays the shutter. When the operator inserts the plug P , the springs s_3 and s_2 are crossed and the coil (j) excited and drop restored, and locked so long as subscriber is talking. The insertion of the plug excites the supervisory relays, the relay R_3 shunting out the lamps. When either subscriber hangs up the proper relay is demagnetized and the respective lamp illuminated.

PLUG-EJECTING JACK.

R. G. Dunfee, Fostoria, Ohio, patents (No. 750,953) an improved device for restoring switchboard plugs. The object of this invention is to provide a simple and inexpensive means whereby the plugs of all cords may be automatically restored when the operator hangs up the receiver. This is illustrated in

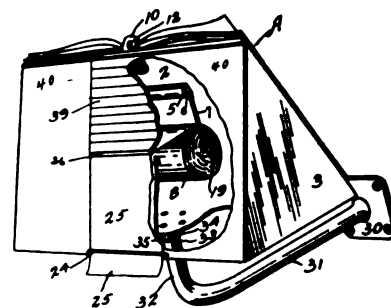


the figure in which 12 is the handle of the plug, which is made in the usual manner. The sleeve of the jack is shown by 11 and the tip of the sleeve spring at 14. In the rear of the jack an electromagnet 23 is provided, which is supplied with a shovel shaped armature 21 connected to a rod 23, which carries a spiral spring that is placed inside of the jack. When the plug is introduced the tip bears against the plunger 18 and presses the spring

pushing the armature on top of the magnet, where it is held by the magnetism so long as the receiver is off the hook. As soon as the subscriber hangs up the receiver the magnet is so magnetized the spiral spring ejects the plug and restores it to its position on the cord shelf.

IMPROVED MEMORANDUM DEVICE FOR TELEPHONE SUBSTATIONS.

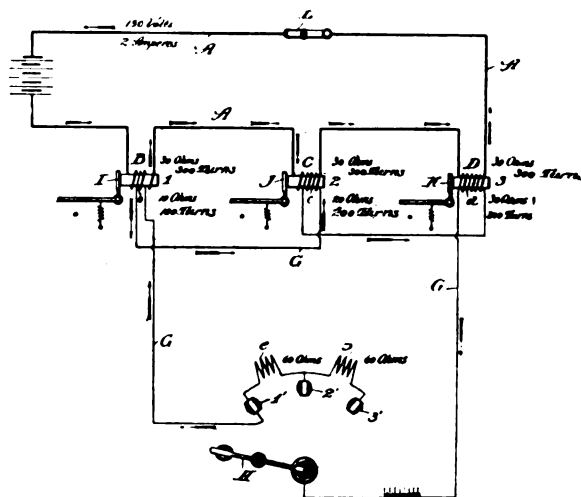
A. D. Irving, Los Angeles, Cal., patents (No. 749,141) an improved device to be attached to subscriber's substations for the purpose of holding the telephone directory and for making a



memorandum. This invention is illustrated in the figure, from which it will be perceived that to 30 a standard 31 is attached. The whole to be arranged can either be screwed or fastened either to the wall or to the substation set. This bracket supports a pyramidal box 3, which is hollow, and on the inside a roll of paper, 8, is supported upon a spindle, 7. This paper is arranged to feed through a hood in the box, 26, and this is always in readiness to receive notes. On the other side of the box the directory can be supported by means of a clip and bracket, 10 and 11.

DEVICE FOR SELECTIVE SIGNALING.

Kennet Moodie and John S. Small, of Chicago, Illinois, patent (No. 750,777) an improved method of selective signaling, and assign by direct and mesne assignments one-fourth to Richard

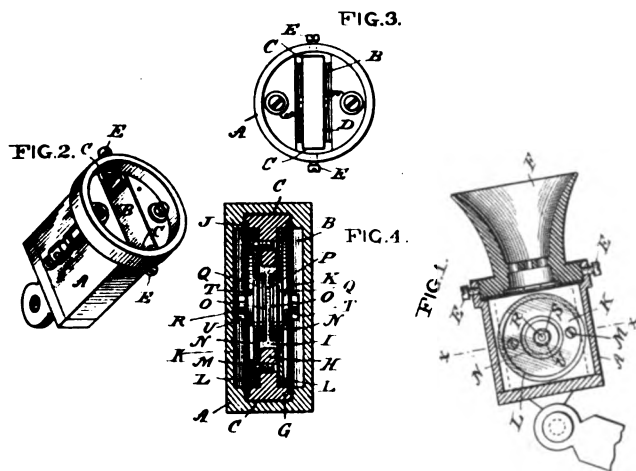


H. and Samuel G. Pierce, of Chicago, Ill. The object of this invention is to provide a method by operating selective signals at a number of different stations. This is illustrated in the figure. The inventors provide a main circuit A , containing a battery or other source of electricity. At the different stations electric magnets B , C , D , are provided, each magnet being wound to the same resistance and number of turns. Consequently all these

magnets will be equally excited. A second or supplementary circuit, *G*, is provided, which is wound in the opposite direction upon the magnets *B*, *C*, *D*; also on each magnet the secondary circuit has a different number of turns and a different resistance, so by supplying the secondary circuit with varying amounts of electricity, it is easy to neutralize the magnetism at any one of the stations at pleasure, thus displaying the signal at that point.

IMPROVED TELEPHONE TRANSMITTER.

E. B. Fahnestock, New York, N. Y., patents (No. 750,835) an improved telephone transmitter. The object of this invention is to make a telephone transmitter of the type which makes use of a microphone; and it consists, first, in providing the transmitter case with a sound chamber and locating in said sound chamber a microphone, so arranged as to be readily removed for inspection and repair; second, so locating the microphone relative to the sound chamber that the diaphragms of the microphone shall be correspondingly acted upon by sound-waves; third, so arranging the diaphragms relative to the supporting body of the microphone that they will be free to vibrate at their periphery and the sound-waves impinge only upon the outer surface of the diaphragms; fourth, in providing the microphone with two sound diaphragms of relatively much greater diameter than the chamber

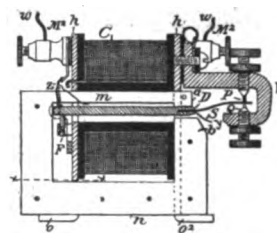


which contains the granular carbon of the microphone; fifth, so arranging the sound diaphragms that they shall be supported by the microphone independent of the transmitter case, and in such manner that they will transmit their motion to secondary diaphragms of much smaller size which form the covers of the chamber containing the electrodes and carbon of the microphone. This invention is illustrated in Figs. 1 to 4, inclusive. *A* represents the transmitter case, containing the sound chamber, *B*. *D* is the microphone and *F* the mouthpiece of the usual type. The microphone consists of the calendar ring *G* having an inwardly projecting flange, *H*, which forms a side of the carbon chamber *I*. In the recesses in each side of the ring *G* are mica diaphragms, *K*, so that this invention belongs to the type of double diaphragm transmitters. To each side of the flange *H*, secured by means of the rings *L* and screws *M*, are the secondary mica diaphragms *M*, which form covers to the carbon chamber. Thus the carbon chambers are electrodes *O O*, and between them the granular carbon is placed.

AN ALTERNATING CURRENT RELAY.

G. W. Pickard patents (No. 749,399) and assigns to the American Telephone and Telegraph Company an improved relay. The object of this device is to provide a relay which is adapted to electric transmission wherein telephone and telegraph circuits are used which carry alternating currents or direct currents, and to provide a relay which is operated by either kind. It is illustrated in the figure. The inventor provides a magnetic system, consisting of a U-shaped bar *n*, which may be of sheet iron or otherwise laminated. Inside of this bar the armature *y* is pivoted by means of the pin *F*, so that it can swing to and fro. The in-

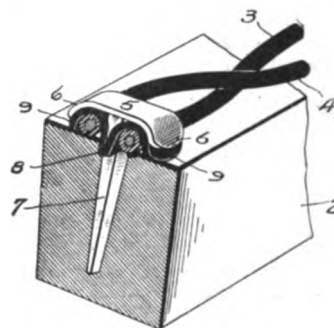
side coils *C* are wound so that the portion *n* of the bar *m*, as well as the armature is on the underside of the coil. When the coil is excited it is obvious that the end *a* will be of different polarity to the end *b*, whereby the armature *y* is similarly polarized; thus



the armature is placed in a very strong field and is also polarized. The armature carries a strong contact *s*, which plays against the stop *P* and *Q*. These stops can be arranged as circuit terminals in any desired way.

IMPROVED WIRING STAPLE.

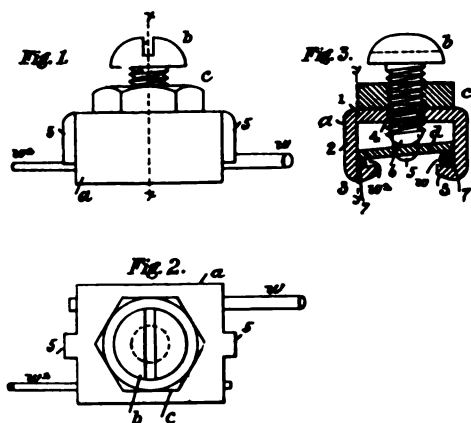
D. G. Smart, Grand Rapids, Wis., patents (No. 751,354) an improved insulating tack for holding electrical circuits. This device is illustrated in the figure, from which it will be perceived that the tack consists of a shank, *7*, arranged to be driven into the wood-work. At top of this shank is a head, *5*, which is T-shaped, and



curved in such a manner as to grasp the twisted pair. Underneath the head a strip of insulating material, *9*, is placed which prevents the tacks from coming into contact with the conductor.

IMPROVED WIRE-CONNECTOR.

J. S. Ford, Chicago, Ill., patents (No. 748,716) and assigns to the American Telephone and Telegraph Company an improved wire-connector. This is a device intended to facilitate the connection of different wires forming parts of the same circuit. It



is illustrated in Figs. 1, 2 and 3. The inventor forms a body *2* out of brass or other similar material. This body carries lugs *3*, which are turned up for the reception of the wires. Upon these lugs is a plate, *d*, which by means of a screw, *b*, can be forced into contact with the wires, locking them into place. This forms an easy method of connecting wires of different sizes.



FINANCIAL

BRIMFIELD, ILL.—The Brimfield Telephone Company has increased its capital stock from \$5,000 to \$10,000.

WILLMAR, MINN.—At the annual meeting of the Minnesota Central Telephone Company, a dividend of 10 per cent. was declared.

MARTINSBURG, PA.—The Morrison's Cove Telephone Company will increase its capital stock from \$5,000 to \$15,000 and construct new lines as rapidly as possible.

COLORADO, TEX.—The Texas & Pacific Telephone Company recently removed its offices from Abilene to Colorado. The company is free from indebtedness and carries no mortgage. It has about 600 miles of toll lines with six exchanges, and has paid 10 per cent. dividends in cash for the years 1902 and 1903. The prospects for 1904 are stated to be exceptionally good, and the managers are considering the advisability of raising some money for extensions by placing a mortgage on the plant this summer.

BARRON, WIS.—The Barron County Telephone Company, by its president, De Witt Post, and secretary, T. W. Borum, has increased its capital stock from \$2,500 to \$22,500.

FOOTVILLE, WIS.—The Footville Telephone Company, by S. W. Lacy, president; W. O. Howell, secretary, has increased its capital stock from \$4,000 to \$10,000.

COMBINATIONS

NEW LONDON, MO.—A. P. Matson and William Raffensberger have purchased the New London telephone system from Henry Lennox and will make extensive improvements.

HOLLIS, N. H.—Albert F. Hildreth has purchased the Hollis Telephone Company.

PULTENEY, N. Y.—An effort is being made to have the Independent telephone companies enter Pulteney, with a view of improving the service.

UNDERGROUND

ATLANTIC CITY, N. J.—The Delaware and Atlantic Telephone Company has made a proposition with a view of burying all its wires in Chelsea and all uptown residential districts.

NEWBURGH, N. Y.—The Hudson River Telephone Company will put its wires underground at a cost of \$78,000.

NASHVILLE, TENN.—The attorney for the Cumberland Telephone and Telegraph Company asked the city council for permission to place its wires within the city limits underground.

ELECTIONS

LAKE CITY, FLA.—The Whetstone Telephone Company, at a meeting held here, elected W. N. Shine, president; M. M. Scarborough, vice-president; M. A. Shine, treasurer. The name of the company was changed to the Columbia Telephone Company.

HYNDMAN, MD.—The Western Maryland and Hyndman Telephone Company has elected De Warren H. Reynolds, president; Urner G. Carl, secretary and treasurer, and George W. Randall, general manager.

BEEKMANTOWN, N. Y.—The organization of the Beekmantown Telephone Company has been completed by the election of L. A. McRoberts, president; George Deloria, vice-president; W. P. Walker, secretary and treasurer.

DARIEN, N. Y.—The Darien Telephone Company has elected D. C. Young, president; Dwight Dimock, of Corfu, vice-president; E. J. Shirne, of Darien, secretary and treasurer. The line will be extended to Erie and Wyoming Counties, to Alexander, Bethany, East Pembroke, Crittenden, Fargo, Alden and other towns.

COLUMBUS, O.—The Citizens Telephone Company has elected Henry Lanman, president; E. R. Sharp, secretary and treasurer; F. A. Bear, manager. A number of improvements were discussed and it was decided to issue \$200,000 in stock in the near future.

CROOKSVILLE, O.—The Crooksville Telephone Company has elected the following directors: Thomas R. Wilson, William Harris, J. C. Moore, H. A. Skidmore, J. B. Rhodes, J. L. Bennett, S. R. Souders. The directors organized by electing J. B. Rhodes, president and general manager; H. A. Skidmore, vice-president; William Harris, secretary, and J. L. Bennett, treasurer. Construction of the plant is nearing completion, and service will be furnished by March 1st. A number of farm lines and a toll line from Crooksville to New Lexington will be built at once.

ZANESVILLE, O.—The annual meeting of the New Concord Telephone Company was held at Zanesville recently. The following directors were chosen: J. B. Rhodes, S. C. Herdman, J. E. McClelland, S. M. Winn and W. D. Forsythe. The directors organized by electing S. C. Herdman, president; J. E. McClelland, vice-president; J. B. Rhodes, secretary and treasurer; S. M. Winn, counsel. A 7 per cent. dividend was declared. During the year the list of subscribers was increased from 75 to 300.

PHILADELPHIA, PA.—The United Telephone and Telegraph Company has elected Richard G. Park, president; W. D. Barnard, vice-president; S. R. Caldwell, secretary and treasurer.

PERSONAL

MR. I. A. BENNETT, general sales manager for the Electric Appliance Company, Chicago, has resigned his post, to take effect March 1st, and will open the Chicago offices of the Phelps Company, of Detroit, Mich., manufacturers of the Hylo turn-down lamps and other specialties. Mr. Bennett resigned a position that he held with the Electric Appliance Company for a considerable length of time, having altogether served with this company about eleven years, having previously been connected with the Ansonia Electric Company. Mr. Bennett has also accepted the presidency of the Central Station Publishing Company, which is being formed for the promotion of Central Station advertising. Mr. Bennett's new offices will be located in the Monadnock Building, Chicago, Rooms 529 and 530.

PATRICK BURNS, president of the American Electric Telephone Company, Chicago, which manufactures telephones and telephone supplies, was recently the guest at a special luncheon at the Columbia Club, Indianapolis, given by the Commercial Club of that city, which is endeavoring to get the company to build a factory in the Hoosier capital.

F. F. TAYLOR, of Schenectady, local manager for the Hudson River Telephone Company, has been transferred to the office of the general superintendent at Albany. He will not leave until March 1. The promotion is an important one.

CONSTRUCTION

JULESBURG, COL.—The Sidney-Julesburg Telephone line will be extended to Big Spring and Ogalla.

NEW SMYRNA, FLA.—Dr. L. B. Bouchelle is arranging to install a local telephone exchange.

ATHENS, GA.—S. L. Hoover, of Winchester, Va., and L. D. Goodrum, of Pennsylvania, are canvassing for subscribers to a new telephone company. They will apply to the city council for a local franchise.

MARLY, ILL.—A meeting of farmers interested in the extension of the Farmers' Telephone Company was held here recently, at which it was practically decided to make many extensions this spring.

ARCADIA, IND.—A company of home people will be organized to construct a local telephone system. L. D. Cox, of Sheridan, who operated a system here, has discontinued it.

DES MOINES, IA.—It is reported that Clyde Brenton, of Dallas Center,

one of the largest stockholders of the Mutual Telephone Company and also of the Hockeye Telephone Company, is behind a movement to establish an independent telephone system in Council Bluffs and Omaha.

PLYMOUTH, ME.—The Plymouth Telephone Company is planning to construct lines to Troy and Detroit and to Dixmont.

LESLIE, MICH.—The Leslie Telephone Exchange and the United States Telephone Company will construct a trunk line to Eaton Rapids and will also construct rural lines throughout this section.

MINNEAPOLIS, MINN.—The Twin City Telephone Company, in connection with the Tri-State Telephone Company, its long distance branch, has purchased property and will construct a new local and long distance exchange, costing between \$50,000 and \$100,000.

OXFORD, MISS.—J. M. Tatum and others have secured permission to erect a telephone line from Burges to Oxford by way of Taylors and Splinter.

OVANDO, MONT.—Jackways and Faust, merchants, of this place, will construct a line from Drummond to Ovando by way of Helmsville.

KALISPELL, MONT.—Farmers of Flat Head County will construct a telephone system with about 200 stations, which will be connected with Kalispell. The scheme is being backed by the farmers' board of trade of Flat Head County.

RED CREEK, N. Y.—George Carker, William Hawley and William Burgdorf have formed a company for the purpose of constructing a telephone line from Westbury to Wolcott, with a loop to Red Creek.

WAVERLY, N. Y.—Farmers living on R. F. D. No. 2 contemplate building a telephone line along the route, connecting it with the Valley Telephone line of Waverly. At a preliminary meeting D. V. Bessemer was elected chairman and W. Wheeler, secretary.

NEW BREMEN, O.—The New Bremen Telephone Company will re-build its plant and increase the capital stock to about double its present size. The work will be in charge of Gustav Hirsch.

CROW, ORE.—Citizens of this place have agreed to organize a joint stock company to build a telephone line from Crow to Elmira, and Elmira people will construct a line between Elmira and Eugene.

CHARLEROI, PA.—N. T. Carson and Sherley Maruba and other farmers of Fallowfield Township will construct a telephone line from their farms and residences in Charleroi.

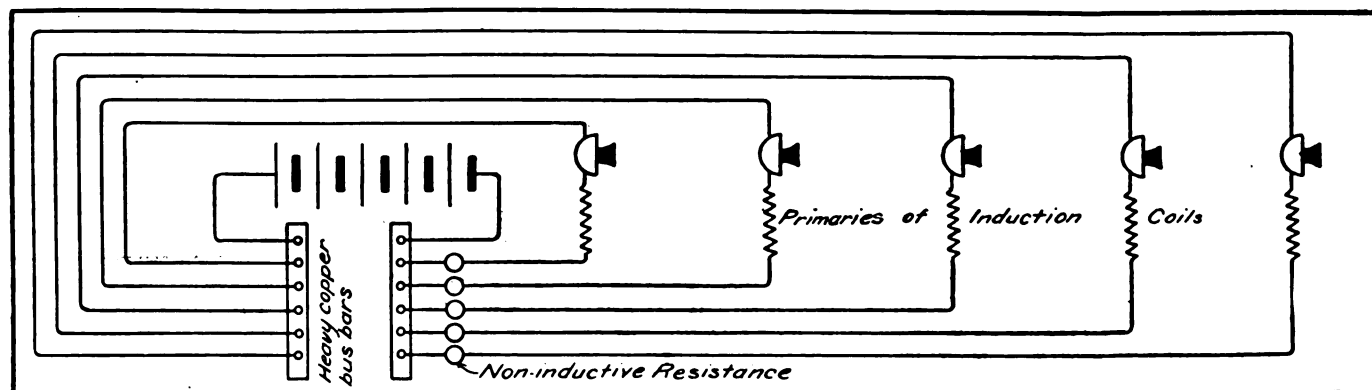
GREENVILLE, PA.—A company is being formed in West Salem Township to construct a telephone system covering 20 miles of territory and connecting with the Sheakleyville and Union Telephone systems here.

A SOURCE OF CROSS TALK

By HENRY FIELD.

IN many exchanges considerable difficulty is experienced with cross talk in the operators' transmitters placed upon the switchboard. So subtle is this trouble that sometimes much investigation is required to detect the cause of the difficulty and considerable expense necessary in its remedy. Experience in the past has shown that it is almost essential to provide each operator's transmitter with a separate pair of leads to the battery which furnishes the source of electricity, and often it has been found that it is necessary to use an exceedingly low resistance

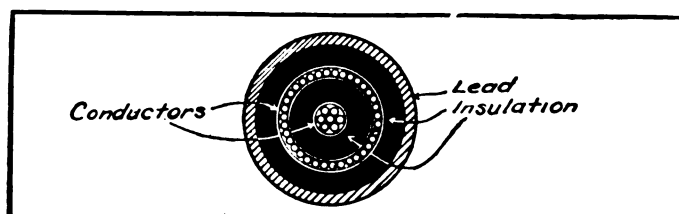
each pole of the battery to the switchboard was suggested. When each transmitter was served by an individual twisted pair of No. 20 wire no difficulty in cross talk occurred, but when all the transmitters were placed upon a single cable of about 50 feet in length cross talk became unbearable, even though a cable of about 200,000 circular mils was employed. In an endeavor to remedy this difficulty larger and larger cables were tried, and it was not until one having an area of nearly 1½ million circular mils was used that the operation of the switchboard was rendered practical, and



Circuit Showing Ordinary Method of Connecting Operators' Transmitters.

battery or else irremediable cross talk results. It has usually been believed that when cross talk resulted in operators' transmitters which were connected upon a common lead the difficulty was owing to the resistance in this lead, and in order to ascertain some idea of the permissible resistance some experiments were tried in the large exchanges.

The source of electricity was a storage battery, and



Drawing Showing Section of Concentric Cable.

under the circumstances it was necessary to place this battery at some little distance (about 50 feet) from the switchboard. It appeared desirable not to run a separate pair of leads for each transmitter, and so the idea of employing one large cable from

even then it was possible for one operator when listening with reasonable intentness to distinguish the conversation of any other one. This experiment indicated that under ordinary circumstances an impractical amount of copper was needed to reduce cross talk within reasonable limits. Then a second experiment was tried by the substitution of a concentric cable made of an inner core of copper having an area of 150,000 circular mils and an external copper sheath made of woven wire having about the same area. In this cable the induction was very greatly reduced, so much so that it seemed possible to employ this form of construction for the transmitter leads. Nevertheless, while conversation could not be understood, the various transmitters could by no means be termed quiet. Some further experiments were made by placing condensers across the two conductors formed by the concentric cable at various points in the line that these condensers would operate as shunts and still further reduce induction, but little or no effect could be noticed upon their introduction. From a commercial aspect, however, the employment of a single cable is not to be recommended, because the cost of a concentric cable of sufficient copper section to render cross talk inaudible is considerably more expensive than the use of individual pairs of twisted wire.

BOOK NOTICE

MACHINE DESIGNING. Part 1. An instruction paper of the American School of Correspondence, by Charles L. Griffin, D. S.

This is a recent issue from that portion of the American School of Correspondence which embraces instruction in the art of machine designing. The author devotes the first few pages to a description of the general method of machine designing, and then takes up a practical case, which is that of a rope drum, and proceeds to instruct the student in the proper method of machine designing by working out a particular case in detail from the first rough sketch to the finished drawing. There are few better methods of imparting instruction, and the particular instance has been carried out with extreme care. The pamphlet concludes with an examination paper. We consider the methods adopted good ones, and that the means that the writer uses to reach his readers are well designed for the correspondence instruction student.

TRADE NOTES

THE WESTERN TELEPHONE MANUFACTURING COMPANY announces that it has leased quarters in the Atlantic Building, No. 42 W. Jackson Blvd., Chicago, and will move its factory and office to that address March 5, 1904.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY announces that its engineering headquarters have been removed to its Rochester, New York, office, and that in the future all correspondence of a technical nature should be sent to that address.

THE NATIONAL WIRE CORPORATION, New Haven, Conn., has just issued a brief catalogue of the various forms of wire which it manufactures. In addition the booklet contains tables showing wire resistances, weights and other similar information. As a hand book the brochure should be valuable to the telephonist.

THE LEWIS LUMBER AND MANUFACTURING COMPANY, of Hattiesburg, Miss., is a concern that makes a specialty of "all heart" and special cross arms. Engineers requiring arms to their own specifications will find that this company is equipped to handle their work with economy and dispatch. Oak and locust pins are also another of the company's outputs.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, recently secured an order from the Kansas Telephone and Electric Company, of Parsons, Kan., for a 1,000-capacity, 600-equipped mechanical self-restoring drop type switchboard and complete protective devices, as well as 200 telephones. The board will be of the above company's latest design and will be equipped with flash light transfers, pilot lamps in connection with both the line and clearing-out equipments, and will be thoroughly up-to-date and modern in every respect.

THE STANDARD UNDERGROUND CABLE COMPANY announces that the annual conference of its branch office managers with the general sales, the manufacturing, the construction and the executive departments of the company, was recently held in the general offices of the company in the Westinghouse Building, Pittsburg, the session covering three days. The reports of each manager for the year 1903 and the business prospects for the year 1904 were presented and discussed, together with ways and means for rendering more efficient service in every department to the customers of the company, who now number considerably over 1,000. A pleasant social feature of the occasion was a theatre party given by Mr. J. W. Marsh, vice-president and general manager of the company, to the visiting managers. The branch office managers attending the meeting were Mr. Chas. J. Marsh and Mr. Geo. L. Wiley, from the New York office; Mr. Frank Clark Cosby from the Boston office; Mr. T. E. Hughes from the Philadelphia office, and Messrs. J. R. Wiley and E. J. Pietzcker from the Chicago office.

MALBY LUMBER COMPANY, of Bay City, Mich., reports that trade is already improving, and if things keep up, it will have done as much business before March 1st as it usually does by the 15th of April. Apparently its customers are taking a step in the right direction. The whole affair is something like Christmas shopping; while the quality of the stock shipped does not vary, "first come is first served." The loss by waiting for a car of poles hung up in a freight blockade will pay a year or two's interest on the money invested in the purchase of poles now instead of later. Usually the pole business does not start up until about the 1st of March. The manager looks over his lines, gets his franchises, permits, etc., and very probably puts in his orders for wire, telephone cable, etc. The one thing that is liable to escape attention is the buying of poles. If he could realize the much greater satisfaction of getting his poles shipped even a few weeks ahead of the time that he needed them, the pole business would be much more evenly distributed, and every one would be happy. As it is, the bulk of the business is crowded into the time when all kinds of coarse freight are just starting to move, and every one wants cars at once. The consequences are well known; every one has to wait.

MEETING OF STERLING ELECTRIC COMPANY.

AT a recent stockholders' meeting at La Fayette, Ind., of the Sterling Electric Company the capital stock was increased from \$150,000 to \$200,000, and other steps were taken for the prosecution of campaign which this company will inaugurate. In addition to the new capital the stockholders have subscribed \$50,000 cash as working capital. The board of directors chosen at the stockholders' meeting consists of William Wallace, Charles Murdock, H. A. Taylor, W. E. Doolittle, C. H. Ankeny, W. R. Coffroth, John Wagner, Jr., John Schnaible and A. F. Ramsey, of Crawfordsville. The officers are W. E. Doolittle, president; H. A. Taylor, vice-president, and W. R. Coffroth, secretary and treasurer. Mr. Coffroth the new member of the board, has a wide reputation and is very well qualified to fill the position.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—One set 5 volumes "Heating, Lighting and Ventilation," new, late edition; 1 set 4 volumes "Telephony," slightly used, published by International Correspondence Schools; 1 complete course "Mechanical Drawing," including 3 bound volumes, same school; 1 copy new "American Telephone Practice," by Kempster B. Miller; 1 fine Wheatstone Bridge, new; 1 galvanometer, new. Any of above sent upon approval on guarantee of express charges. H. A. BRINKERHOFF, Fulton, Ark.

140

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

SAVE A DOLLAR OR \$0. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich.

131

SALESMEN WANTED.—Reliable men to carry as a side line, an up-to-date line of Advertising Fans, sold to Furniture, Hardware, Drug, Shoe and General Merchants. Convenient to carry. Prompt remittances. GEO. H. JUNG & CO., Cincinnati, O.

139

WANTED.—Position by man with fourteen years' experience. good practical, as well as theoretical, knowledge of the business; associated the past four years with one of the largest Independent companies in the country. Would accept a position in the engineering department of a manufacturing company. Good circuit man and have had installing experience. Territory west of Chicago preferred, and contract required. References given. Address, Box 132, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

132

POSITION WANTED.—By a man with seven years' experience as a wire chief in a large Western city with a modern plant. He is familiar with all branches of the business. Address Box 135, care of AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

135

POSITION.—Cable splicer desires position with some telephone or construction company. Address, Box 138, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

138

SITUATION WANTED.—By a young man as troubleman or switchboard repair man. Have had five years' experience with Bell company. Would like position with some Independent company. Best references. Address, F. E. Stewart, 4 Ashland avenue, La Grange, Ill.

141.

Price isn't the whole thing in buying Poles, although we will admit it is a pretty big factor.

You wouldn't buy an unfashionable, ill-cut suit of clothes, simply because it was sold cheaper than what your tailor could quote you. You want the *best* that can be gotten at a *reasonable* price: *we have it.*

Try us before you order the next car.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

46 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

The Valentine-Clark Co.

*Beg to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

IT'S SO EASY TO TEST

With one of my special instruments.

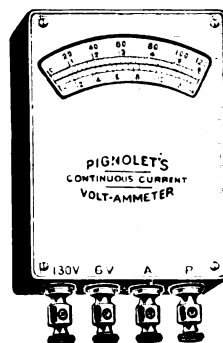
The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.

It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

They don't cost very much.



LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

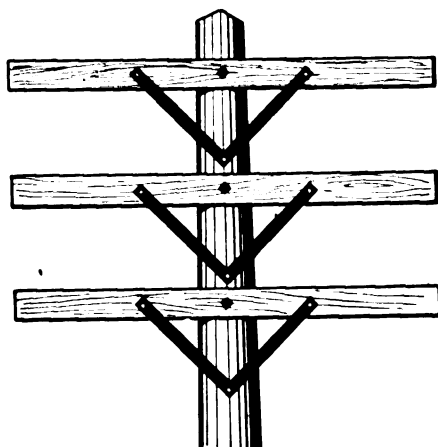
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

IDAHO

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

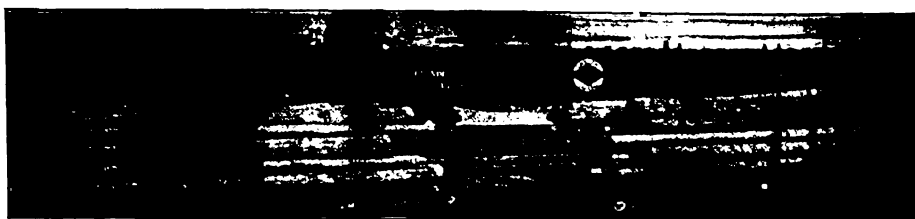
THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, WIS.

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

SPECIAL CROSS ARMS ALL HEART Long Leaf Yellow Pine

We can furnish any quantity promptly. Output 500,000 ft. per month.
Prices low—quality the best. Write us for delivered prices.

Lewis Lumber & Mfg. Co., R. R. Akers, Mgr.
HATTIESBURG, MISS.

Tell the Advertiser you saw his announcement in

The American Telephone Journal.

E. OHURCHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND



Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

The Morse
Cedar
Co.

CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.

Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

Large Stock

16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:

Menominee, Mich.
Escanaba,
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

POLES

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.


Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♣ ♣ ♣

Toll Tickets
Toll Station Journals
Toll Station Ledgers
Monthly Check Reports
Receipts for Toll Service
Receipts for Exchange Service
Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

A Great Educator

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

**The American
Telephone Journal**

*116 Nassau Street,
New York City.*

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ♣ ♣ ♣ ♣

74 CORTLANDT STREET,

NEW YORK CITY

LE ROY W. STANTON Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR** " " "
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY, ENGINEERS CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE

• DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of energy.

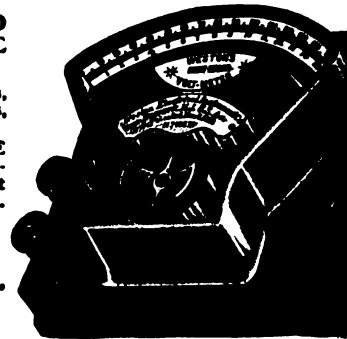
**Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.**

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

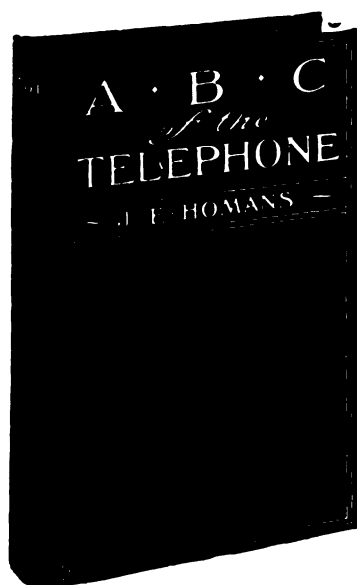
IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	



*New and Revised Edition of the A. B. C.
of the Telephone and a year's
subscription to*

**THE AMERICAN
TELEPHONE JOURNAL**

\$1.50

The regular price of the "A. B. C." is \$1.00. This edition has been revised and brought up-to-date by the author, and is now one of the best books on telephony in print.

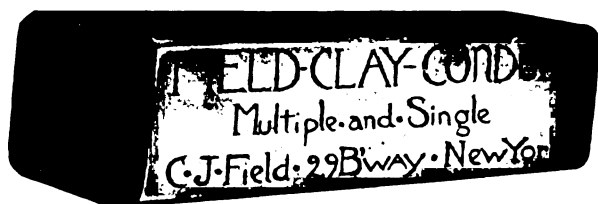
THE AMERICAN TELEPHONE JOURNAL

is the best telephone paper published. The subscription price is \$1.00 for 52 numbers (1 year). Cut this out and send in your name now for this special offer.

Name.....

P. O. Address State.....

NOTE—This offer is not good on renewals of subscriptions



*Large Factories in East and West.
Moderate Prices. Prompt Deliveries.*

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 E. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY
Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,
KANSAS CITY, MO.

ADVERTISERS' DIRECTORY—Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.

Churchill, E., Heron, Mont.

Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.

Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast role Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof ;

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

170 Broadway, New York, N. Y.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the **WESTERN ELECTRIC COMPANY.**

ADVERTISERS' DIRECTORY—Concluded

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.</p> <p>POWER PLANTS.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>PROTECTORS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.</p> <p>SEALS.
Middleton & Co., J. W., Chicago, Ill.</p> <p>SIGNS.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.</p> <p>SOLDER, RESIN CORE.
Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>STATIONERY.
Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.</p> <p>STEEL.
Leslie A. C., & Co., Montreal, Can.</p> <p>STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.</p> | <p>SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.</p> | <p>Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONE BOOTHS.
Yesbura Manufacturing Co., Toledo, Ohio.</p> <p>TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.</p> <p>TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> | <p>International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co. Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbura Mfg. Co., Toledo, O.</p> <p>TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>TOLL TICKETS.
Gildart Bros., Albion, Mich.</p> <p>TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebeling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co., Pittsburg, Pa.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Experience
is a wise teacher
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

**YOU WILL LIKE
OUR**

Leich



4



Party

**Selective Telephones
IF YOU USE THEM**

WRITE FOR OUR NEW SELECTIVE BULLETIN

**American
Electric Telephone Company
CHICAGO**

THE AMERICAN TELEPHONE JOURNAL

Good Advertising And the Right Medium—

Mr. Charles F. Speed of the Washtenaw Home Telephone Co., Ann Arbor, Mich., in a paper read at the Michigan Association Convention, (see page 148 this issue), said:

"I can assure you that good advertising pays. * * * I buy poles for a price I am sure none of you can beat, and as fine poles as I ever saw. I learned of the firm through an advertisement. * * * The same condition prevails in all other material. I save my salary and more every month, by answering advertisements and learning where to buy. * * * Advertise what you have to offer and read the advertisements of what others have."

Mr. Speed reads The American Telephone Journal, and it was in the Journal he saw the pole advertisement mentioned above.

Remember it is not so much what you advertise or how, as it is the medium. This paper is head and shoulders above all others as a medium for telephones and supplies.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MARCH 5, 1904—CHICAGO Number 10

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

CONDUCTORS AND INSULATORS.....	By E. R. Lucy
A CORD TESTING SET FOR MAGNETO SYSTEMS.....	By C. Bundesman
AN INEXPENSIVE TESTING SET.....	By Arthur Kneisel

The Operating Field:

POLE PIN AND CROSS ARM INFORMATION WANTED
VERMONT INDEPENDENT MEETING
TELEPHONE BILL, IN SOUTH CAROLINA, PASSES HOUSE
"PHONALARM" PROTECTIVE DEVICE
SIMPLE TESTING EQUIPMENT
INDEPENDENCE, MISSOURI, NEW PLANT

NORTHERN INDIANA AND SOUTHERN MICHIGAN MEETING
COMBINATION TELEPHONE DIRECTORY OF CHICAGO
BALTIMORE FIRE DOES NOT INJURE UNDERGROUND
SELLERS, MO., TELEPHONE EXCHANGE
OHIO AND INDIANA ALMOST CONNECTED
THE TELEPHONE IN THE COURTS

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 160.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

Eaco No. 36 Telephone

COMPACT TYPE CABINET.

The one we pride ourselves on; an exchange favorite; neat, compact, takes little wall space; handsome from every point of view; low in price.

5-Magnet Generator Type especially recommended for rural or heavily loaded lines.

Is equipped with a new and extra large generator. Guaranteed to ring more bells satisfactorily than any other.

Has a Carbon Lightning Arrester.

Noxem Double Pole Receiver (no exposed metal parts), Type B Transmitter.

Long lever hook with platinum contacts. Two cells 1900 Dry Battery.

Woodwork is finished to a Piano Polish.

Special Offer:

The above telephone will be furnished complete as shown, **\$11.00.**

Leaflet Giving the Whole Story Upon Application.

Electric Appliance Co.,

Telephone Manufacturers; Electrical Supplies.

92-94 W. Van Buren St.,

CHICAGO.

Will you take the People's Word?

Subscribers in the following cities will tell you that Automatic telephone service is the best:

Chicago, Ill.	Grand Rapids, Mich.	Portland, Me.	Fall River, Mass.	New Bedford, Mass.
Augusta, Ga.	Albuquerque, N. M.	Columbus, Ga.	Cleburne, Tex.	Dayton, O.
St. Mary's, O.	Medford, Wis.	Manchester, Ia.	Princeton, N. J.	and many others.

Automatic Electric Company,

Chicago, U. S. A.

Write
Today



Our
Telephone
Cables

400 PAIR
AND SMALLER

Need no introduction

Let us quote on your Specifications

THE F. BISSELL COMPANY
TOLEDO, O.

Bulletin 226 on

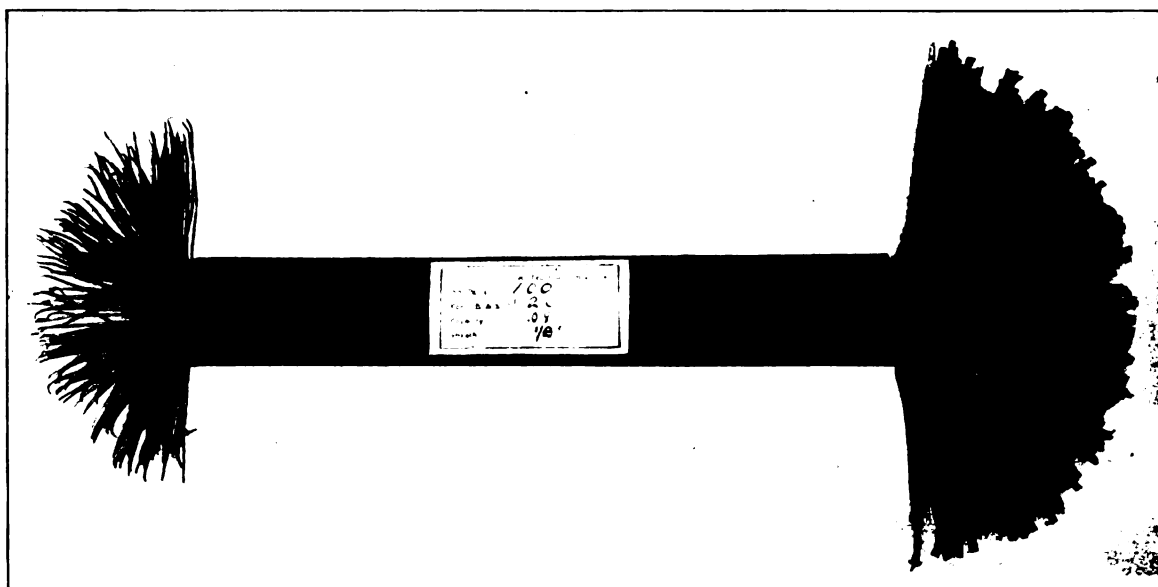
WIRES
CORDAGE
STRANDS
and
CABLES


will be sent pre-
paid on request

STROMBERG - CARLSON

DRY CORE L E A D COVERED CABLE

**Special Sizes and Capacity to Meet the
Requirements of the Purchaser.**



Superior Qualities, High Grade Material,
Superior Forming, Prompt Delivery. 
Prices the Lowest, Quality Considered.

Stromberg-Carlson Tel. Mfg. Co.

Gen'l & Eastern Sales Office,

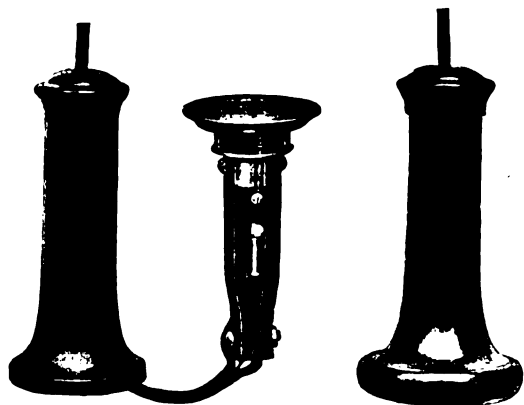
ROCHESTER, N. Y.

Sales Dept.,

CHICAGO, ILL.

For the Good of Your Service
USE

Century No. 10 Receivers

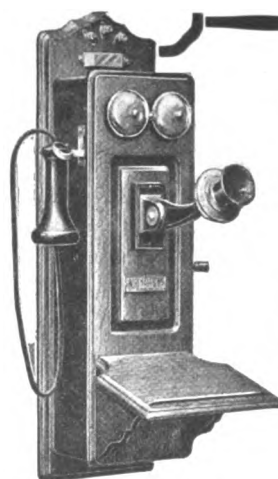


Perfect
Mechanically



Perfect
Electrically

CENTURY TELEPHONE CONSTRUCTION CO.,
536 Ellicott Square,
BUFFALO, N. Y.



WRITE
TO-DAY

THE
NORTH
ELECTRIC
CO.

CLEVELAND,
OHIO, U. S. A.

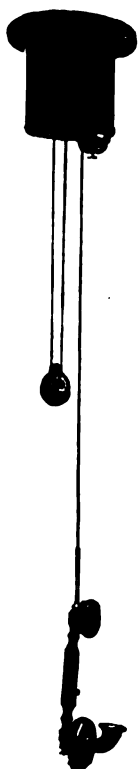
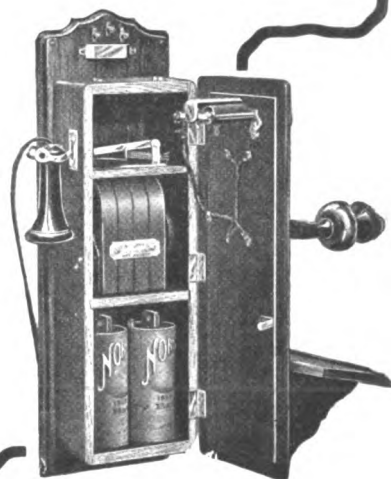
156 St. Clair St.

C N 160

All Right for Quality
Well Balanced Equipment

TELEPHONES THAT NEVER WEAR OUT

TRY ME



The Bed-ridden Invalid

can have a 'phone within reach at all times.

The Busy Doctor

should have one at his bedside.

The Luxuriously Inclined

or the temporarily indisposed may accomplish much before arising.

While for the man at the

Desk, Counter or Bench

THE PENDENT TELEPHONE

hangs always at hand; is never in the way of papers, goods or work; or the second 'phone that many have, is movable to and adjustable at practically any point, and is much more elegant and exactly as efficient, durable and cheap as the ordinary desk set.

ASK FOR IT

WRITE US NOW

THE VOUGHT-BERGER COMPANY

MAKERS OF FIRST-AWARD

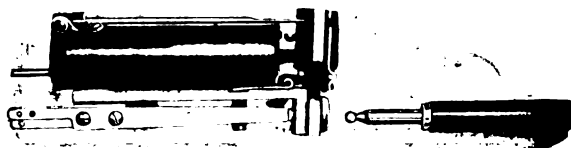
Telephones, Switchboards and Appliances

LA CROSSE, WISCONSIN

INTERNATIONAL Telephone Mfg. Co.

Mechanical Self Restoring Drop SWITCH BOARD

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity and durability of parts, perfection of mechanical detail and neatness of design it has no equal.

WRITE FOR BULLETIN "A."

International Telephone
Manufacturing Co.

CHICAGO, ILL.

Multiple Switchboards

**T
E
L
E
P
H
O
N
E
S**

COMPLETE LINE MANUFACTURED BY



LA FAYETTE, INDIANA

**T
E
R
M
I
N
A
L
S**

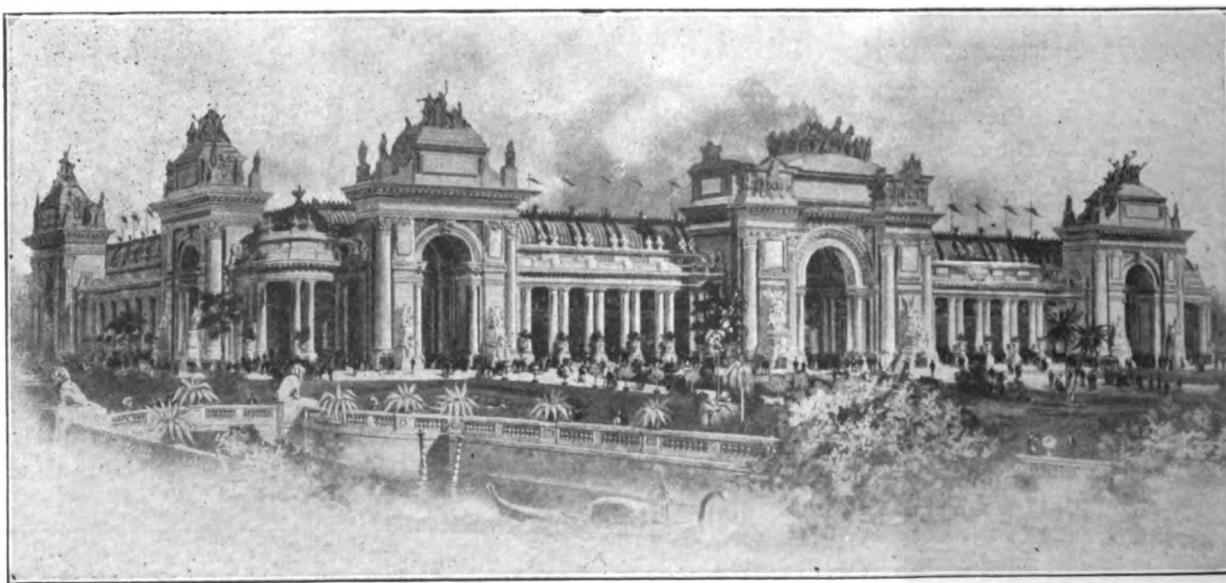
PROTECTIVE DEVICES

World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

**T
E
L
E
P
H
O
N
E

I
N
S
T
R
U
M
E
N
T
S**



PALACE OF LIBERAL ARTS.

**T
E
L
E
P
H
O
N
E

S
U
P
P
L
I
E
S**

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus 909 Market Street, St. Louis, U.S.A.
Dealers in "Everything Used with Telephones"

The High Character of Kellogg Apparatus

AND THE

Absolute Reliability of the House

**Are making our business
outgrow our buildings,
as a healthy boy
outgrows his clothes.**

**KELLOGG SWITCHBOARD AND
SUPPLY COMPANY** 

Green and Congress Streets, Chicago

**ELECTRIC BUILDING, CLEVELAND.
KEYSTONE TELEPHONE BUILDING, PHILADELPHIA.**



MONARCH COMPACT TYPE TELEPHONES

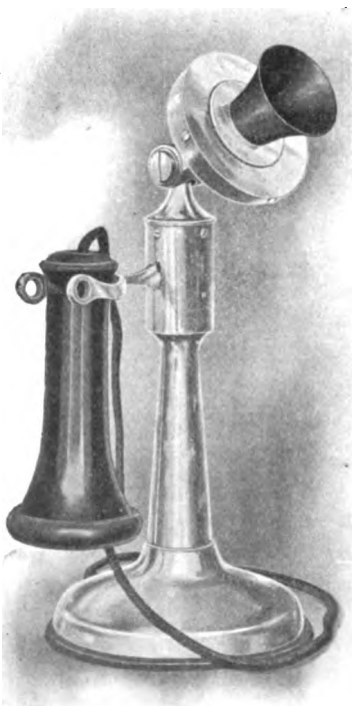
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

The Perfect Desk Set



Perfect Transmission

- " Receiving
- " Switch Con-
tacts
- " Soldered
Connections
- " Nickeling
- " Strength

A Perfect Beauty
for Local or
Common Battery

ADOPT IT
and cut your
maintenance half

The Eastern Telephone Mfg. Co.
West Chester, Pa.

Reliance Transmitter

No. 90



For mounting on woodwork
or adjustable arms



The Button
(actual size)

**ORDER ONE TO-DAY
SAMPLE PREPAID**

75 Cents.

S. H. COUCH CO.
162 PEARL ST. BOSTON, MASS.

Construction Tools,
"Ready" Reels,
Cable Cars, Etc.

THE W. G. NAGEL ELECTRIC CO.,

Telephones, Wire,
Cables, Insulators,
Etc.

TOLEDO, O.

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Dickey Clay Mfg. Co., W. S..... 36	Klein, Mathias, & Sons..... 33	Roebling's, John A., Sons Co..... 32
American Electric Teleph. Co..... 40	Eastern Telephone Mfg. Co..... 9	Leslie, A. C., & Co..... —	Sand Point Cedar Co..... 30
Am. School of Correspondence..... 11	Electric Appliance Co..... 3	Lewis Lumber & Mfg. Co..... 33	Scovill Mfg. Co..... 3
American Vitriified Conduit Co..... 39	Elkin Machine Co..... 33	Lindsay Brothers Co..... 32	Shaw-Walker Co..... —
Automatic Electric Co..... 3	Ericsson Telephone Co..... 10	McIntire, C., Co..... 36	Standard Pole & Tie Co..... 30
Barr, W. J., Mfg. Co..... 12	Fahnestock Transmitter Co..... 34	Maltby Lumber Co..... 29	Standard Underground Cable Co..... —
Beidler, Francis & Co..... 33	Field, C. J..... 36	Michigan Cedar Co..... 33	Stanton, L. W..... 34
Bissell Co., The F..... 2	Fowler, John H..... 32	Middleton, J. W., & Co..... 34	Sterling, W. C., & Son..... 33
Butterfield, J. F..... 34	Franklin Rolling Mill & Fdy. Co.. 31	Miller Anchor Co..... 30	Sterling Electric Co..... 6
Camp, The H. B. Co..... 39	Gest, G. M..... 38	Monarch Telephone Mfg. Co..... 8	Stromberg-Carlson Telephone Mfg. Co. 4
Central Mfg. Co..... —	Hemingray Glass Co..... —	Morse Cedar Co..... 33	Swedish-American Tel. Co..... 12
Central Telephone & Electric Co.. 6	Holtzer-Cabot Electric Co..... —	Nagel, W. G., Electric Co..... 9	Telephone Printing Co..... 33
Century Telephone Const. Co..... 5	Huebel, C. J., & Co..... 29	National Wire Corporation..... 35	Valentine Clark Co..... 30
Chicago Insulated Wire Co..... 34	Hyde, W. H., & Co..... 34	New Haven Novelty Machine Co.. 2	Vought-Berger Co. 5
Chicago Writing Machine Co..... —	Imperial Finance & Cons. Co..... 34	North Electric Co..... 5	Wanted, Situations, etc..... 160
Churchill, E..... 33	Ingram-Richardson Mfg. Co..... 12	Nungesser Electric Battery Co..... —	Weston Electrical Instrument Co. 34
Cohn & Bock..... 33	Index of the Technical Press..... —	Okonite Company 34	Wisconsin Timber & Land Co.... 33
Columbia Electric Co..... —	Inland Steel Co..... 32	Pacific Coast Pole Co..... 30	Worcester, C. H., Co..... 29
Connecticut Teleph. & Electric Co. —	International Telephone Mfg. Co. 5	Pignolet, L. M..... 8	Yesbera Mfg. Co..... 12
Cook, Frank B..... 35	Kellogg Switchboard & Supply Co. 7	Pittsburg & Lake Superior Iron Co. 29	
Couch, S. H., Co..... 8		Pittsburg Sewer Pipe & Conduit Co. 36	
Crumb, W. H. Co..... 34			
Cunningham Iron Co..... 36			
BATTERIES.			
Clark, James, Jr., & Co., Louis-ville, Ky.	Bissell Co., The F., Toledo, O.	CABLE SLEEVES.	
Electric Appliance Co., Chicago, Ill.	Chicago Insulated Wire Co., Chi-ago, Ill.	Nagel, W. G., Electric Co., To-le-do, O.	Cunningham Iron Co., Boston, Mass.
Nungesser Electric Battery Co., Cleveland, O.	Kellogg Switchboard & Supply Co., Chicago, Ill.	New Haven Novelty Machine Co., New Haven, Conn.	Field, C. J., New York.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Nagel, W. G., Electric Co., To-le-do, O.		Gest, G. M., Cincinnati, O.
	National Wire Corporation, New Haven, Conn.		Nagel, W. G., Electric Co., To-le-do, O.
	Okonite Co., New York.	CARD INDEX SYSTEMS.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.
	Roebling's Sons Co., John A., Trenton, N. J.	Shaw-Walker Co., Muskegon, Mich.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
	Standard Underground Cable Co., Pittsburg, Pa.		
	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	CLIMBERS.	CONNECTORS.
		Klein & Sons, Mathias, Chicago, Ill.	Cook, Frank B., Chicago, Ill.
		Nagel, W. G., Electric Co., To-le-do, O.	McIntire Co., C., Newark, N. J.
			Nagel, W. G., Electric Co., To-le-do, O.
		CONDUITS.	CONSTRUCTION SUPPLIES.
		American Conduit Co., Chicago, Ill.	American Electric Tel. Co., Chi-ago, Ill.
		American Vitriified Conduit Co., New York.	Electric Appliance Co., Chicago, Ill.
		Camp Co., The H. B. New York.	

WANT AND FOR SALE ADVERTISEMENTS, PAGE 160.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

A High Quality-Efficient-Durable and Cheaply Maintained Telephone.

Is what you know
you're getting when
you buy an Ericsson.

The first cost is
practically the only
cost. No repairs or
after expenses are to
be counted as with
cheaper grades.

Write to-day for il-
lustrated booklet and
price list.

**Ericsson
Telephone
Co.,** "Strictly
Independent."

Manufacturers and Importers of

**Switchboards, Telephones and Telephone
Supplies for Magneto and Common Battery.**

296 Broadway, N. Y.



ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Leslie, A. C., & Co., Montreal,
Can.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago,
Ill.

CORRESPONDENCE SCHOOL.

American School of Correspon-
dence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Townsend Cedar & Supply Co.,
Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon,
Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

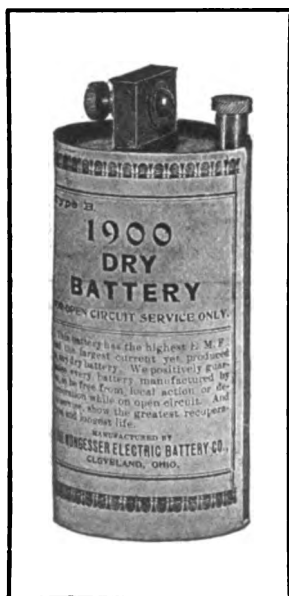
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., To-
ledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contract-
ing and Operating Companies.

Standard size two and one-half inches in
diameter, six inches high, made especially
for telephone use, but is adapted to all kinds
of bell work.

*Complete Stock
Always on Hand*

JAS. CLARK, Jr. & CO., Louisville, Ky.

Distributors of Telephone Supplies and Construction Material

MECHANICAL
ELECTRICAL
STATIONARY

DRAWING ENGINEERING

ARCHITECTURE—TELEPHONY

CIVIL
SANITARY
TEXTILE

Illustrated Bulletin giving full information free on request.



HUNDREDS of aspiring young and middle-aged men in all walks of life know what the instruction of the American School of Correspondence is. Other hundreds need just such instruction to enable them to get on in life. To bring to the attention of draftsmen, engineers, and others interested in drawing, the high standard of our instruction, we have compiled from the regular instruction papers in our Drawing Courses a practical treatise under the title of

Compendium of Drawing

....IN....

TWO VOLUMES 900 pages
ONE THOUSAND ILLUSTRATIONS, including full page drawings, —
sections diagrams, and folding plates

Money
refunded
if not
satisfactory

\$5.00

By Express
prepaid

In two monthly
payments of
\$3.00 each.
Single
volumes
\$3.00 each

On receipt of this amount (Address, Room 9 K) AND THE NAMES OF TWO PERSONS whom you know to be interested in our courses (designating the course), the books will be sent express prepaid, with the privilege of returning within 10 days if not satisfactory and money refunded.

The regular examination questions of the school are bound into each volume to test the reader's knowledge.

A compendium of such practical value and covering so many branches of drawing has never before been offered. The separate volumes necessary to cover the ground would easily cost \$15.00. We are offering it at substantially cost, because we know an examination of the work will show at once the practical value of our instruction.

Partial List of Contents.

PART 1.

Mechanical Drawing, by Prof. E. Kenison, Massachusetts Institute of Technology, Boston. Instruments and Materials, Geometrical Drawing, Projections, Line Shading and Lettering, Blue Printing.

Shades and Shadows, by Prof. H. W. Gardner, Massachusetts Institute of Technology. Principles and Notation, Co-ordinate Planes, Ground Line, Problems, Short methods, Full page rendered Examples.

Pen and Ink Rendering, by D. A. Gregg, Massachusetts Institute of Technology. Materials, Values, Accents, Faults, Rendering by Shadows Only, Pencil Work, Suggestions, Examples.

Perspective Drawing, by Prof. W. A. Lawrence, Massachusetts Institute of Technology. Principles, Station Point, Vanishing Points, Ground Line, Horizon Line, of Measures, Perspective Plan, One Point Perspective, Curves, Distortion.

Architectural Lettering, by F. C. Brown, Architect, Boston. Study of Old Examples, Forms, Proportions, Composition, Spacing.

Full page examples, Greek, Roman, Gothic, Renaissance, Office Lettering.

PART 2.

Working Drawings and Mechanism, by Prof. W. H. James, Massachusetts Institute of Technology, and Prof. U. L. Griffin. Threads, Bolts, Nuts, Scales and Assembly Drawings, Blue Printing, Cam, Pulleys, Belts, Gearing, Pencil Layouts, Working Drawings, Cost, Dimensions, Lettering, Order Sheets.

Machine Design, by Prof. C. L. Griffin, formerly Professor of Machine Design, Pennsylvania State College, now with Somers-Solvay Co. Theoretical and Commercial Considerations, Original Design, Hand-books, Data, Calculations, Notes, Records, Forces, Friction, Stresses, Lubrication, Power Transmission, Speed Ratio, Power, Load, Layout, Belts, Pulleys, Shafts, Gears, Clutches.

Sheet Metal Pattern Drafting and Tinsmithing, by Wm. Neubecker, New York Trade School. Construction, Tools, Intersections, Developments, Irregular Shapes, Triangulation, Approximate Developments, Practical Shop Problems.

The instruction papers in every one of the 60 courses of the school have been prepared like these by men of recognized standing in their several professions.

AMERICAN SCHOOL OF CORRESPONDENCE, At Armour Institute of Technology
CHICAGO, ILL.



"Hercules"

Positively the strongest
and most durable brider
on the market.

100,000

IN DAILY USE

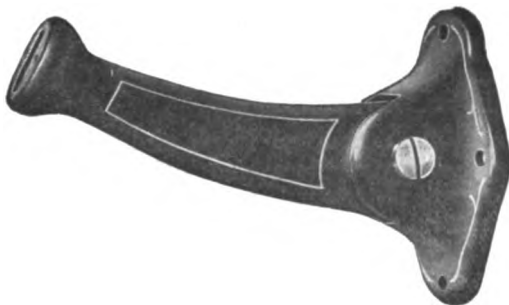
BECAUSE

*They are superior to others.
Give better service.
Cost less to maintain.
Ask us for catalogues and
prices.*

Swedish-American Tel. Co.
CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



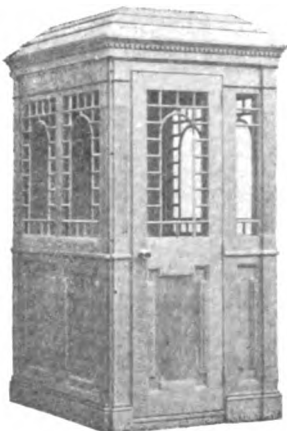
ADDRESS "BARRARM," CLEVELAND



Do You Believe In Signs?

If so, you want a good sign.
That's the kind we make—
and sell to all the wise companies.
Our signs are eye-catching and durable.
Let us submit designs and prices for your
benefit and ours.

INGRAM-RICHARDSON MFG. CO.
BEAVER FALLS, PA.



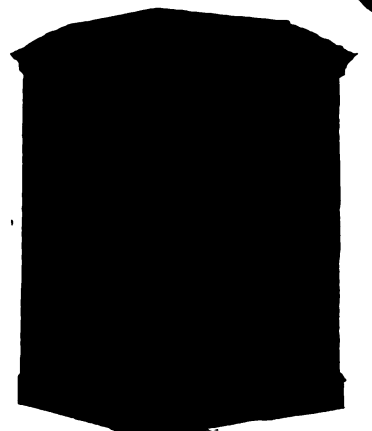
Booth Advantages

Privacy and comfort—that's why people will
pass half-a-dozen exposed telephones to get
the privacy and exclusiveness of a **BOOTH**,
and *that's* why every pay station should have
one or more.

The best are made by

YESBERA MFG. CO.
TOLEDO :: :: :: OHIO

BOOTH Catalogue for the Asking.



The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MARCH 5, 1904

NUMBER 10

CONVENTION OF MICHIGAN INDEPENDENTS

THE Michigan Independent Telephone Association met in annual convention at Grand Rapids, Mich., February 24th and 25th. The attendance was larger than that at any previous meeting of the State Association, over 100 delegates, representing upward of fifty Independent operating companies, being in attendance. An unusual degree of enthusiasm and interest was displayed, and as a working convention it undoubtedly stands first among the State meetings held thus far this year.

The Citizens' Telephone Company, of Grand Rapids, kept open

dends to their local stockholders has also been a great incentive to investors, and this partially accounted for the wonderful expansion of the Independent interest throughout the State. He called attention to the new exchange at Ann Arbor, now in course of building, and which will be a most valuable addition to the Independent system on account of the thousands of students and others allied with the State University, who make Ann Arbor their temporary home during several months of the year. At Ypsilanti also there is a very good prospect that a new exchange will be installed. Continuing, President Fisher said in part:



Delegates to Michigan Independent Convention, in Exchange of Citizens Telephone Company, Grand Rapids.

house for the delegates, and the meetings of the Association were held in its exchange building. The forenoon of Thursday was devoted to an inspection of the up-to-date and commodious new quarters of the Citizens' Company, interest, of course, being centered especially in the recently installed automatic system.

The business sessions of the convention opened Wednesday afternoon. In the absence of Mayor W. M. Palmer, the delegates were welcomed to the city by the Mayor's secretary, who delivered a short address, drawing attention especially to the progress in telephony and the influence of the telephone on the moral and civic life of the people, a consideration which he thought might possibly be lost sight of in the discussions of the convention. President E. B. Fisher replied in behalf of the convention, and then delivered his annual address. He extended a hearty welcome from the Citizens' Telephone Company, modestly calling attention to the fact that the company which he represented possessed the largest Independent system in the State. Speaking of the association, he said that the past twelve months had been the most prosperous and progressive in its history, and that, without exception, the Independent companies of Michigan had grown, both in number of telephones and in the mileage of their toll lines, that metallic circuits are now almost universally the rule, and that the best of apparatus is being installed, whether for rural or urban service. The fact that the Independent companies have invariably been able to pay divi-

"Heretofore no bureau of the State Association has attempted to compile accurate statistics of the number of telephones in Michigan, or of the long distance mileage connections there. An approximate estimate, however, can be made which will be sufficiently correct to enable a clear view of the growth of the past year. The Citizens Company, in its directories, from the very first has given a list of long distance connections, with the number of telephones included in them; these have not included quite the entire Independent interest of the Lower Peninsula, but nearly all of it. This compilation has been made from reports to the Citizens Company by our friends so connected with us. From those it is a fair statement that in February last there were less than 31,000 telephones where now there are more than 40,000. A growth of 10,000 in one year is something to be proud of. The expansion of long distance mileage has been in nearly the same ratio. The Citizens Company, which has only kept pace with its neighbors in this respect, has added 232 miles of copper circuits alone since we gathered at Lansing a year ago.

"We are to have a long distance connection with Chicago in the near future. We expect the Detroit situation to develop as it should—it cannot stand still, and the logic of events in that direction is irresistible. Our neighbors in Ohio and Indiana, over whose lines we must pass to get to the East, South and West, are preparing to greatly increase the facilities which will be at our disposal in this important respect.

"Yet there is one phase of the present situation that your executive committee deemed of special importance, as reference to the program for this meeting will show you. There are four papers on it on one topic, 'Rural Telephones.' The Independents early conceived that in this field of service there were great possibilities of usefulness, and of strength for the Independent systems. So they at once, so far as they were able, began to cultivate that field, and with results that abundantly justified their anticipation. Now our competitors realize the importance of this service and are striving most earnestly and energetically at least to share in it, both because it can be made to pay when proper prices are charged for the service, and because it strengthens the city exchange. There are phases of this effort, this competi-

tion, that should receive your most careful consideration, and there are also matters, as to your own relation to it, that need discussion, to the end that harmonious theories and action may obtain. Hence the prominence given this topic in the program.

"We fear that Mr. Payne, who was at one time very considerably interested in the Wisconsin Bell Telephone Company, has too pleasant remembrance of his old friend to quite clearly apprehend the importance and relation of the Independent systems. It is believed that our Congressmen, who are far better informed as to the facts in this regard, can by concerted action secure the rescinding of this order and a general attitude similar to that enjoyed in our own State.

"We do need what may be called a State Clearing House Association until we get a better name for it. All of us know of vital matters which are not properly acted upon now; of revenues we are not getting that in equity belong to us; of encroachments in territory that are engendering jealousies and impairing service; of inequalities in rates that might be remedied with the power of a State organization and united action to assist in securing such results; of technical difficulties in long distance equipment and service that would disappear through the good understanding that such an organization would insure; of the advantages that systematic rules would give in long distance service.

"The expansion of the Independent telephone system of the country at large has been quite as phenomenal as in our own State; indeed some regions surpassed us in 1903. At the annual meeting of the Wisconsin Association on the 10th and 11th it was reported that ninety new companies, with a million and a half of capital, have been incorporated within two years there, that there are 350 exchanges and 1,200 toll points in the State with 35,000 telephones. In Indiana there were 107,000 Independent telephones when 1904 began; eight years ago there were but 6,000 telephones in that State. From Iowa, Ohio, Pennsylvania, Kentucky, Missouri, Kansas, New York come similar reports. Mr. Wain's paper will follow up this thought, and will prove to you that we have plenty of company assisting us in the good work."

Following the President's address, Mr. R. F. Johnson, Treasurer of the Association, presented his annual report, showing a considerable balance on hand. Mr. Johnson incidentally called attention to the fact that the Michigan Association was the only one of the State organizations which did not solicit financial support from manufacturers.

A paper was then read by Dr. G. S. Root, of Hart, Mich., on "Our Experience with Farm Telephones." He dwelt exclusively on the conditions existing in his part of the State. He did not consider that a line was overloaded at less than eighteen party telephones, in case good metallic circuits were employed. He strongly recommended the use of the lock-out system, which his company has installed on some of its rural lines. Dr. Root said in part:

"Our company commenced building country lines about 1895. There was only a gradual growth until 1898. The first lines were grounded series, which were followed by metallic series lines, which were in turn followed by grounded bridged and metallic bridged lines. Now the country lines are equipped with bridged instruments of not less than 1,600 ohms resistance, and for the Oceana division 2,000 ohm instruments are used. We have fifty-one rural lines leading from our exchanges, with an average of twelve and one-quarter miles and of eleven and one-half telephones per line, making almost one telephone per mile. Our longest line is thirty-two miles and has twenty-seven telephones installed.

To make money on a good metallic line of twelve miles in the country a good many telephones will be required, at present prices, to make it pay.

Our prices for rural telephones on lines that are established and run by the door are \$15 the first year, payable in advance, and \$12 per year payable quarterly in advance after. We give the privilege of talking anywhere in the county for this price. We also give to our country subscribers the weather report daily, excepting Sundays and legal holidays. We find that the earnestness with which this report is looked forward to and the value that is placed on it is such that we would not dispense with it for twice the trouble it costs us. While some of our lines are considered overloaded we have demonstrated it to our satisfaction that we can ring on twenty-five and thirty miles of line twenty-five and thirty telephones on the line, provided we can keep the eavesdropper out. In the ordinary party lines that we have been talking about, it is impossible to locate the eavesdropper. We have come to the conclusion that the only proper thing to do in building country lines is to build an "A" No. 1 metallic toll line. I use the word toll so as to impress the fact that farmers' lines should be built just as toll lines. We realize that no company can afford to give copper service on the farmers' lines, and use No. 10 or even No. 9 B. B. iron wire, although up until the present time we have used No. 12. In earlier stages of our development there were three country lines built with No. 9 wire, and because they caused less trouble breaking and talked better than the others we have come to this conclusion.

We have on two lines the lockout system furnished by the Stromberg-Carlson Telephone Manufacturing Company. These lines were installed July, 1903, and one has been used as a test line. It is fourteen miles long and has on it eighteen telephones. The line is metallic, of No. 12 B. B. wire, and equipped with double the number of telephones that the manufacturers ever expected would be used. Should we have a line of from six to eight miles long of No. 12 iron wire or of fourteen miles of No. 10 copper, we could handle eighteen telephones on it with satisfaction.

Our experience has led us to conclude that we will build no more country lines unless we use a lockout system and charge accordingly.

The control that we have had on the line, and the absence of the eavesdropper, has made us more enthusiastic than we otherwise would be.

We feel the value of the farmers' lines. No small exchange can prosper unless it has the outlying country and villages connected. Therefore, we are dependent on the farmers' lines.

One of the easiest ways to build up an exchange in a small town is to first build three or four country lines and run them into it. The more added country lines, the more demand is made on the business men in the town, and soon there is a demand for a good sized exchange."

This paper was followed by an extended discussion of rates and apparatus in vogue on rural lines throughout the State. It developed that there was a wide divergence of opinion in this matter, and a general desire manifested itself for some action on the part of the convention, looking to uniformity in rates as far as practicable.

Mr. R. J. Johnson, of Saginaw, Michigan, was on the program for a paper on "Old and New Ideas on State Clearing Houses." Mr. Johnson had not prepared a paper, but discussed informally the desirability of organizing a clearing house association for the purpose of settling accounts and adjusting differences between interconnecting companies. On request, Mr. Johnson read the paper which he prepared for the previous meeting of the association, embodying in the form of constitution and by-laws his ideas as to the scope of such

an organization. (This paper was published in full in *The American Telephone Journal* of March 21, 1903.)

A general discussion followed, and it was the unanimous verdict that definite action toward the forming of a traffic agreement of this character should be taken. This, however, was deferred till the Thursday session.

Mr. W. O. Hunt, of Adrian, was expected to read a paper on "A County System Including Rural Telephone Service," but was unavoidably detained from attending the convention.

"Telephone Accounting" was the subject of a paper, an abstract of which follows, by W. J. Melcher, of Alma, Mich.

"In order that the earnings of each element of a telephone system can be ascertained, it is necessary to open an account with each unit, that is:

(a) Each exchange. (b) Each toll station. (c) Each toll line. This account should be so arranged as to independently show the following items for each unit:

- (1) Amount invested and cost of additions.
- (2) Earnings. (a) Rental. (b) Toll. (c) Miscellaneous.
- (3) Cost of operating and maintenance directly chargeable to this unit.
- (4) The pro rata share of the general expenses for this unit.
- (5) Depreciation.
- (6) Size of unit.

Each individual account should be so arranged that all items of expense and earnings show in detail. The sub-division can be made as minutely as desired, but beyond a certain point the detailed information obtained is of less value than the amount of labor required to secure it. A few words will suffice to make clear the purport of the several items embodied.

(1) In regard to the first item: "Investment Account." This would contain all expenses incurred in the construction of the unit, as well as the expenses of enlarging, etc. This can be sub-divided if desired, to show, for instance (a) Aerial construction; Underground; Cable and Equipment.

(2) As regards the second item: "Earnings." The most satisfactory manner to keep track of the earnings from telephone rentals is to keep a duplicate record of the telephones leased at each exchange at the general office. By this method we can determine with reasonable accuracy the income of the system from rentals for six months ahead. This is especially true as contracts for a specific period are made with each subscriber and the leaser forced to adhere to his agreement. The value of taking written contracts at the time of installation of a telephone is not to be underestimated, and at no time are the contracts easier to secure. The contract can be drawn up in such a manner as to contain certain features, which after the telephone is installed, are of great advantage to the telephone company. If contracts have no other value, they serve to avoid a great many disputes



President E. B. Fisher.

as to rates, payments and period of rental, and for those reasons alone, warrant their use for every telephone rented.

Toll earnings cannot be recorded until after the end of the month, but by having the toll revenues of the same unit together, it may be readily ascertained whether this particular unit is increasing in proportion with the rest of the system.

(3) The account of Cost of Operating and Maintenance. The account should be sub-divided so as to separate out its main component factors. For example: Operating can be sub-divided into (a) Wages; (b) Rent, light and heat; (c) Incidental. Maintenance can be sub-divided into (a) Wages and traveling; (b) Material; (c) Rent, light and heat; (d) Incidental.

This sub-division must necessarily be made according to the particular wants of the system.

(4) The pro rata share of the general expense can be distributed from time to time and the share borne by each unit properly charged.

(5) Depreciation should be charged according to the amount invested. This subject of Depreciation is a much debated question to-day, some writers maintaining that it is not necessary to take the matter into consideration at all. They claim that by proper care, repairs and maintenance, the plant can be kept at 100 per cent. efficiency. Looking at it from a different standpoint, depreciation is due primarily to two causes: first, the process of decay, and second, superannuation. Depreciation caused by decay may be approximately estimated by past experience, but who can foretell how soon in the ever progressing march of applied sciences, a telephone equipment may become obsolete? During the past, the average life of a switchboard has been about fifteen years. Not that they were worn out and unfit for service, but they had become antiquated and had to make room for more modern equipment. As no one can foresee how soon change will have to be made, and equipment now valuable will have to become obsolete, ought we not to set apart a fund to take charge of the needed reforms in such a way as not to necessitate a charge against the earnings of the company all at one time?

(6) The last item of the account, that of Size of Unit. It is absolutely essential to keep track of the increase and decrease in the number of instruments in operation. It is only by keeping all the foregoing accounts that one is able to ascertain the average investment, expenses and income, per telephone of each unit. In that way we can compare units of the same size and under same conditions as to their earnings and expenses, and thus manage the business on the most economical basis.

The system used by the Union Telephone Company, as outlined above, and in order to facilitate the posting of accounts, the detail ledger is ruled for each division of expenses, earnings and investments. The total items are carried in a general account, so that each department of the entire system is known. The ledger is of the loose leaf type and arranged in alphabetical order, making the system very flexible. For rentals the card system is used, which in some respects presents some advantageous features over the book form of lease record.

In the evening the delegates took dinner at the Pantlind Hotel as guests of the Citizens' Telephone Company, of Grand Rapids. President Chas. F. Root, of the latter company, presided, and after the dinner had been discussed, he turned the meeting over to President Fisher, of the association, who acted as toastmaster. Addresses on various topics of interest to telephone men were delivered by a dozen or more speakers.

At the opening of the Thursday morning session, Mr. R. B. McPherson, of Howell, Mich., read a paper on "Our Needs in Southeastern Michigan." He briefly but emphatically set forth the imperative demand for adequate Independent service in the city of Detroit. He reviewed the history of the movement in that city, and commended the Co-operative Telephone Company which had been fighting the Bell interests there. He stated that the Bell Company had fostered, quite successfully, a public sentiment antagonistic to an Independent system, and that an Independent company would encounter great difficulty in securing a firm foothold there, unless backed by liberal capital. Mr. McPherson also pointed out certain counties in the southeastern portion of the State, which he believed offered a fertile field for Independent companies.

Mr. N. F. Wing, of Jackson, spoke on "Rural Development in Jackson County." He told of the gradual development of farmers' lines in the district in which he is interested. Jackson County has a population of approximately 47,000, of which the city of Jackson claims 30,000. There are about 4,000 telephones in the county, and every town has an Independent telephone ex-

change. The only serious competition comes from the farmers' mutual lines. Mr. Wing stated that after an experience of several years he would recommend that in building farmers' lines that no expense be incurred in soliciting subscribers until after poles were set and lines strung; then, he said, fully 80 per cent. of the farmers would be only too anxious to have telephones installed.

Mr. C. E. Tate read a paper entitled, "Is the Time Right for Three-Minute Service?" The gist of which was as follows:

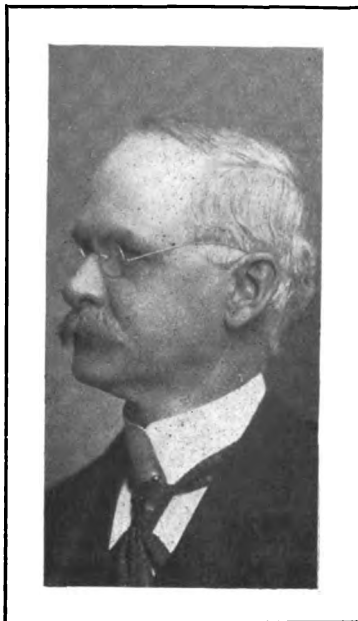
"Toll messages at the present rate of one-half cent per mile for five minute conversations are not as profitable as they should be, and it has been suggested that a schedule of three-fifths cents per mile should be adopted.

The proper time limit of toll messages, and upon which toll rates should be based, is that period nearest to the time consumed by the average message. It should not be so brief that it is but a small factor compared with the time consumed in scoring and getting ready to handle the message. As for example: one minute service is too short because the length of time in which the line is earning money is too short as compared with the time necessary to get both parties ready.

A careful study of several thousand messages shows that they average close to three minutes. We should calculate what would be the proper rate for this time, and let the subscriber who talks longer pay an extra price.

When subscribers learn that three minutes is the limit they will condense their messages and use few unnecessary words, and it will be found that many more messages can be handled than at present.

Over 80 per cent. of toll line business is handled between 6 A. M. and 6 P. M., during the balance the lines are idle. We should offer inducement to subscribers to use the lines during these unprofitable hours, and the most feasible way is by the special "night rate." Experience shows the night rate does not interfere with regular business and stimulates use for social purposes. This use of the line for social purposes develops the telephone habit, and as it grows we find our lines made more profitable and that people having gotten into the habit of depending on the telephone for outside communications, will use it more often during business hours."



Treasurer R. F. Johnson.

Mr. H. A. Douglass, of Jackson, read a paper on "A City's Relation with Rural Lines," which is here reproduced in part.

"The average American farmer is progressive. He more than most other men is a social being, and in the progress and advancement of the present age, demands closer intercourse with his fellowmen. He is no longer satisfied with his weekly paper or magazine, but must be in close touch with the business world to enable him to take quick advantage of favorable markets and dispose of produce before leaving home. The telephone brings him, as it were, into town.

It is understood that efforts are being made to have the post office authorities telephone the farmers when they have important mail or special delivery letters, that they may be opened and read to the persons to whom they are addressed, if it is so desired.

There are two classes of farm service; those who desire connection directly with the farmers in their neighborhood without city service except as toll, and those that care but little for the country, but want the advantage of the city exchange without the disadvantage of the toll service. The latter are generally those living within a few miles of the larger centers with which they do business. They care little for the country connection except with their nearer neighbors, whom they can easily reach, as they generally have a similar service. The latter is the one in which the exchange manager at the present moment should be the most interested.

It is of vital importance that we should at once extend our lines a few miles into the country in every direction from our exchange, and connect all the farmers within that distance with our switchboards, giving them as good service as we are giving our city subscribers. Connect your lines so that you may ring grounded through tip and sleeve, thus reducing the annoyance of the rings more than two-thirds. Ten-party central energy lines can in this manner be used with considerably less disturbance from the bells than the old style magneto four and five-party lines. Close connection with all rural lines is of the utmost importance to the city exchange. The merchants expect and demand such connection, and will patronize the company that best serves them in this particular line.

The greatest difficulty with which we have to contend is the effort of the mutual companies to extend their lines from town to town, and switchboard to switchboard, over which they give free service. In some places toll lines have been paralleled with free lines. It is our purpose to connect with and serve these people, but they must not lose sight of the fact that we are furnishing the best of city service in all of the larger towns, and have built and are building toll lines into the country in all directions in order to give them connection with the cities, and that there must necessarily be a limit to free talk.

The farmer must be taught that in order to give good service, a reasonable income and profit must be allowed. Toll lines built between towns must be respected. That their lines must end somewhere. Their management must be placed in the hands of some one conversant with the business and capable of handling it properly.

The "Switch Tenders" and some of the owners of mutual lines are demanding a percentage of the tolls for business passing to and from their lines. Whenever they have a "clear line" (as they call it) between two towns or stations giving a good service in connection with your toll lines, they should receive a commission or fee for switching. It is your duty and that of every Independent manager to bind the farmers to you by bonds of friendship. Encourage their proper and sensible organizations.

One of the greatest factors in the upbuilding of the Jackson Exchange, I confidently believe to be the extended and almost complete connection with the farming community in Jackson and surrounding counties, where we can reach with good metallic circuit, almost every hamlet and cross-road.

"The National Situation of Independent Telephone Companies" was the subject of an interesting paper by J. B. Ware, of Grand Rapids. Mr. Ware traced historically and statistically the growth of the Independent movement throughout the country.

At the opening of the Thursday afternoon session, Mr. Chas. F. Speed, of Ann Arbor, read a paper on "What We Are Doing in Washtenaw County." In part Mr. Speed said:

"The Washtenaw Home Telephone Company have undertaken to build up the entire county of Washtenaw. We have Ann Arbor, of 15,000 inhabitants, then Ypsilanti, of 10,000. In Chelsea an Independent company connects with the Bell, as also at Saline. We have invited both to join with us, but it appears that they wish us to build up the entire county, except in their town, and give them, not only better service than they now have with their Bell connection, but a large percentage of tolls and more towns with which they can connect.

We have three (3) other towns, Dexter, Manchester and Milan. In Dexter we have the best of the situation. We have enough subscribers there to warrant that statement, and they come to us every day.

In Manchester nothing has been done. You all have connection with that point through the U. S. lines.

At Milan, the Monroe County Telephone Company, of Dundee, asked for a franchise, which was refused. In all justice we shall give them time to build the town.

We are building copper toll lines, using No. 10, throughout the county from east to west and north to south, and by April first we have to provide a direct connection from Jackson and the southwest to Detroit, and from the Livingston County line to the south and southeast.

We are erecting our own building in Ann Arbor, as we will do in Ypsilanti.

We want you to see that the college boys who may go from your town are instructed to talk for us and refuse to use the Bell system. They are a big feature of our city and we want them with us.

I would like to see the Independent companies take up the question of advertising their toll connections. I can assure you that good advertising pays. You can not make a better investment or get a greater return from a small sum of money. I do not mean by this, advertising in town and city directories and such publications, I mean in newspapers and signs put where the traveling public can see them. Think what you are advertising and how it is best to do it.

Most of you take one or more of the trades papers. The advertising in those papers should be the most attractive part to the manager, and when he wants supplies he should not, in justice to the company he represents, buy a dollar's worth of any material or apparatus without first writing to the advertisers and obtaining their prices. Study for yourselves as to the quality.

I buy poles for a price I am sure none of you can beat and as fine a lot as I ever saw. I learned of the firm through an advertisement.

The same condition prevails in all other material, cross arms, line insulators, etc. I save my salary and more every month by answering advertisements and learning when to buy the best goods for the least money.

Advertise what you have to offer and read the advertisements of what others have to offer. If this advice is followed by every one of you, then you are worth more money to the company you represent.

After a general discussion, the various committees presented their reports. Upon motion, a committee comprising Charles E. Tarte, of Grand Rapids; Edward Stacey, of Benton Harbor; W. J. Melcher, of Alma; Dr. C. S. Root, of Hart, and R. F. Johnson, of Saginaw, was appointed to select a clearing house committee which shall have full authority to draw up a code of rules for the conduct of a State clearing house, and establish the same at the earliest possible date. It is probable that each of the ten toll-line companies in the State will be represented upon this committee. The purpose is to employ a clearing house manager with such assistants as he may need, with an office cen-

trally located. It will be the mission of this institution to adjust all differences between the companies interchanging business, and to apportion the rates for such business as is done. The expenses of the clearing house will be defrayed by the respective companies, according to the amount of business which they do.

After an animated discussion, the following resolution was adopted, requesting all Independent manufacturers to refrain from selling telephonic apparatus to companies which might be stated for the purpose of competing with legitimate Independent companies:

WHEREAS, It is necessary to have the continued success of the Independent, in order to permanently insure to all desiring telephone advantages, the benefit of good service at reasonable rates, and

WHEREAS, The only menace to this very desirable condition is the possible destruction of successful Independent interests by so-called Independent competition, fostered by or working in the interests of Bell companies, and

WHEREAS, The manufacturers and jobbers of Independent apparatus can prevent such competition to Independent interests by selling their apparatus only to companies or persons already doing successful Independent business, or to those who propose to build or operate Independent properties in territory not already occupied with Independent exchanges or lines; now therefore

Resolved, That we condemn the practice of the manufacturers or jobbers in telephone apparatus in any way encouraging or assisting competition to Independent interests, and request all such not to knowingly sell telephone apparatus to be used in competition with any successful Independent exchanges, farm or toll lines now in operation, or which are actually in the course of construction. And we further request such manufacturers

and jobbers not to employ agents or representatives who encourage or promote competition to Independent interests. We also call attention to the fact that the sale of inferior telephone apparatus to rural and other telephone companies, is injurious to the best interests of Independent telephony, and the practice should be discontinued.

A general discussion ensued upon the recent order of the Post Office Department, relative to displacing Independent telephones in the more important postoffices, and granting the Bell companies exclusive privileges. A special committee reported resolutions, expressing the sentiment of the association on this subject. The resolutions were as follows:

WHEREAS, We understand that an order has been issued by the Post Office Department, restricting the use of telephones in postoffices to the one in connection with Washington, D. C., making it a necessity for them to use only the Bell Company system, and

WHEREAS, This, to the minds of Independent telephone men, appears to be an entirely unjust discrimination in favor of Bell Company interests, by reason of the Postmaster-General's connection and sentiment toward that monopoly, thereby using an official position of the Government to further interests detrimental to the users of about 2,030,000 Independent telephones, as against about 1,230,000 users of Bell Company telephones in the country; and

WHEREAS, The Independent companies, being also long distance companies, but without connection with Washington, D. C., outnumbering the Bell companies, would be seriously injured in not having connection with the postoffices upon which they are dependent; and

WHEREAS, It is unnecessary to retain the Bell connection solely for the purpose of connecting with Washington, as there are only a very few calls made to that city from points distant therefrom; and for the use of department inspectors, Independent lines can furnish in most cases the same, or better facilities than the Bell Company, and in very many cases the only connection, for their use.

Resolved, That the Michigan Independent Telephone Association vigorously protests against the unjust discrimination attempted to be practiced in this instance; and be it further Resolved, that the secretary of this association be instructed to send copies of this resolution to Theodore Roosevelt, President, and Henry C. Payne, Postmaster-General; to each of the Senators, and to each Member of Congress from this State; and be it further Resolved, that the executive committee be instructed to appoint a committee of three to have charge of this matter and co-operate with similar committees from other State associations.

A resolution was also adopted, urging upon the hotels of Detroit the desirability of admitting Independent telephone booths, and in attaining this end, it was determined to enlist the active support of the commercial travellers of the State, who are especially interested in this matter.

All the officers of the association were re-elected, only two changes being made in the executive committee. The officers are:

President—E. B. Fisher, Grand Rapids.

Vice-President—R. B. McPherson, Howell.



Chas. F. Speed.

Secretary—C. F. Brown, Alma.

Treasurer—R. F. Johnson, Saginaw.

These officers, together with the following, will constitute the executive committee: Wm. Robinson, Muskegon; W. O. Hunt, Adrian; J. Robinson, Benton Harbor; A. E. Palmer, Kalkaska; W. E. Wing, Grass Lake.

A proposition from the United States Directory Company, of Chicago, to issue a State directory of Independent telephones was endorsed.

A resolution was then adopted by the association, thanking the Citizens' Telephone Company, of Grand Rapids, for its courtesy to the delegates in giving the use of the exchange for holding the sessions of the convention and for the dinner at the Pantlind Hotel Wednesday night. The convention then adjourned *sine die*.

LIST OF TELEPHONE COMPANIES REPRESENTED.

Citizens Telephone Co., Grand Rapids; C. F. Root, E. B. Fisher, C. E. Tarte, F. V. Newman, A. Stacey, E. Land, Geo. F. Stratmeyer, H. V. Weed.
Homer Telephone Co., Homer; R. C. Smith.
Litchfield Telephone Co., Litchfield; Charles G. Sherk.
Monroe Co. Telephone Co., Dundee; F. W. Grandolph, E. J. Meyers.
Farmers' Telephone Co., Henrietta; F. H. Wheeler, Chicago, Ill.; J. M. Fuller, Henrietta.
Citizens Telephone Co., Muskegon; L. B. Smith, Wm. Robinson.
Leslie Telephone Co., Leslie; W. G. Stewart.
Citizens Telephone Co., Jackson; H. A. Douglas.
Washtenaw Home Telephone Co., Ann Arbor; C. F. Speed.
Swaverley Telephone Co., Kalkaska; C. W. Swaverley.
Blissfield Telephone Co., Blissfield; John Kent.
Woodland Telephone Co., Woodland; F. F. Hilbert.
Southern Michigan Telephone Co., Burr Oak; R. L. Himebaugh.
Citizens Telephone Co., Lake Odessa; G. A. Weed.
Citizens Telephone Company, Greenville; T. G. Howard.
Otsego Co. Telephone Co., Gaylord; Frank Calkins.
Williamston Home Telephone Co., Williamston; F. N. Monroe.
I. & M. Telephone Co., Fort Wayne, Ind.; G. F. Triet.

Citizens Telephone Co., Vermontville; C. E. Smith.
Citizens Telephone Co., Hastings; J. E. McElwain.
Citizens Telephone Co., Nashville; J. C. Furniss.
Eaton Co. Telephone Co., Charlotte; W. W. Libhart, C. E. Chappell.
Citizens Telephone Co., Lansing; F. B. Johnson, G. H. Higgin, J. B. Lockwood.
Lake Shore Telephone Co., Hart; Geo. S. Root, F. C. Hughes, W. C. Snyder, H. S. Newton, Wm. Steimer.
Citizens Telephone Co., Coopersville; S. E. Hosmer.
Citizens Telephone Co., Holland; W. H. Orr.
Union Telephone Co.; C. F. Brown, J. H. Fildew, Alma; H. E. Jeffery, Mt. Pleasant.
Calhoun Co. Telephone Co., Battle Creek; A. A. Burch.
Co-operative Telephone Co., Detroit; C. M. Burton, A. A. Cowles.
Benzonia Co. Telephone Co., Benzonia; H. B. Woodward, W. A. Young.
Citizens Telephone Co., Cedar Springs; C. S. Clark.
Citizens Telephone Co., Cadillac; F. M. Kooyers.
Citizens Telephone Co., Traverse City; C. W. Wheelock.
Western Michigan Telephone Co., Allegan; M. B. Owen.
Valley Telephone Co., Saginaw; R. F. Johnston.
Citizens Telephone Co., Mason; Mason Reynolds.
Farmers Telephone Co., Grass Lake; N. F. Wing.
Rives Telephone Co., Rives Junction; C. W. Cook.
Twin City Telephone Co., Benton Harbor; E. G. Stacey.
Citizens Telephone Co., Ionia; D. Campau.
Citizens Telephone Co., Portland; F. L. Francis.
Howard City Telephone Co.; W. F. Negler, Howard City.

MANUFACTURERS REPRESENTED.

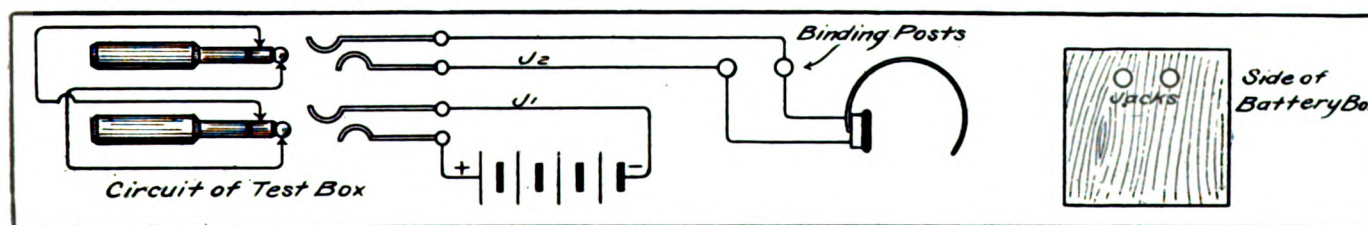
Illinois Tunnel Co.; S. F. Harris, Chicago.
Automatic Electric Co.; J. F. Crook, Chicago.
Stromberg-Carlson Telephone Mfg. Co.; A. B. Smith, Charlotte, Mich.
Standard Underground Cable Co.; J. R. Wiley, Chicago.
The F. Bissell Co.; M. S. Walker, Toledo, O.
J. Andrae Sons & Co.; D. J. Berry, Milwaukee, Wis.
John A. Roebing's Sons' Co.; J. S. Worthington, Chicago.
Central Electric Co.; R. L. Kimble, J. W. Mason, Chicago.
Globe Automatic Telephone Co.; C. G. Maywood, Browning, Chicago.
Illinois Electric Co.; C. J. Litscher, Chicago.
Century Telephone Construction Co.; Byron L. Moore, Buffalo, N. Y.
American Electrical Works; Edgar H. Hammond, Chicago.

A CORD-TESTING SET FOR MAGNETO SYSTEMS

By C. BUNDESMAN.

TO provide a device for detecting cut outs in cords the writer has built a test box which is easily constructed and which will be found well worth the time taken to make it. The apparatus required can be found around any exchange and will

As a rule, the trouble in cords will be found where the cord leaves the plug, and by cutting off two inches of the cord and making it up anew into the plug the old cord can be made to serve as well as a new one.



Circuit Diagram of Cord Testing Set.

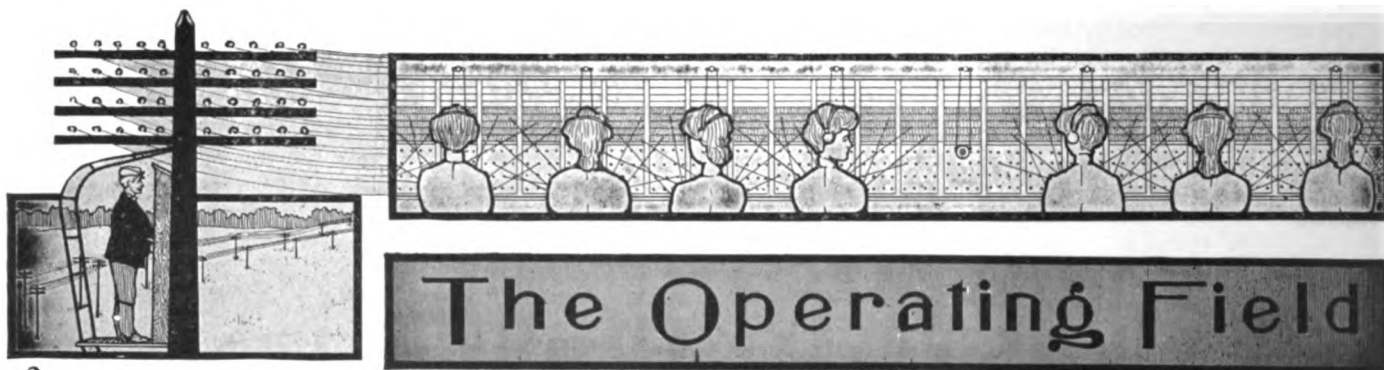
cost nothing. A great many instances where subscribers complain of being cut off can be laid to cut outs in connecting cords, so the importance is obvious of keeping all cords in A1 shape and replacing one as soon as it becomes defective. The material necessary to construct this test set consists of three cells of dry battery, a small box to support the jacks and hold the batteries, two spring jacks and one head receiver. To construct the test box drill two holes one side of it about one inch from the top and equidistant from each side, and mount the jacks in them. Make the connections to the jacks as shown in the accompanying diagram. To test with the set take the answering plug of any cord circuit to be tested and insert it into jack J1, then insert the ringing plug into jack J2. Obviously a circuit is now completed through the battery and head receiver. Now take hold of the plug that has been inserted into jack J1 and hold it firmly. Then take the cord about five inches from the base of the plug and shake it gently from side to side. If a scratchy or grating noise is heard in the receiver it is an indication that the cord is in bad condition and should be repaired or replaced at once. If no noise is heard the cord is all right.

TO PRESERVE TELEPHONE POLES.

IT is claimed by some telephone men who do not wish to go to the expense of using a preservative on a pole, that painting the pole with a good graphite paint for two feet above and two feet below the ground line is found beneficial; or, better yet, to paint from a couple of feet above the ground line to the butt of the pole. This, it is said, effectually does away with the destructive rotting that always takes place just where the pole enters the ground. While one is painting it would also be well to paint the roofs of the poles and the gains.

RODENT TROUBLEMEN.

ACOUNTRY paper which is published in one of the central eastern states is responsible for the following: "The exchange of the Mutual Telephone Company is closed to subscribers and will not be opened until Friday. The workmen have found that mice have been playing havoc with some of the mechanical contrivances. The mice have cut the tapes and destroyed many other parts of the apparatus."



POLE PIN AND CROSS-ARM INFORMATION WANTED.

HERMAN VON SCHRENK, chief of the Forest Products division of Government Bureau of Forestry, is sending the following letter to those interested in poles, cross arms and pins, and to any who use such forest products. The research that is being carried on is of vital interest to all in the telephone industry, and we trust that those who read this and do not happen to receive a communication from the Bureau will send answers to the questions and the information asked for. Address Herman von Schrenk, United States Department of Agriculture, Bureau of Forestry, Washington, D. C. The following is a copy of the letter:

In view of the increasing difficulty of obtaining suitable timber for poles, cross arms, and pins, and of the urgent need for measures to insure a future supply, this Bureau is preparing a bulletin on the telephone and telegraph industry, which will deal with the getting out of the necessary timber, with its subsequent handling, and with its preservative treatment. You can greatly aid the work in hand by assisting this Bureau in the collection of information pertaining to the telephone and telegraph industry. For this purpose I enclose a list of questions with the request that you answer them in as much detail as possible.

- May I send you a copy of the bulletin when completed?
1. What kind of timber do you use for:—(a) Poles, (b) Arms, (c) Pins?
 2. What are the standard specifications for each?
 3. From what parts of the country do you get your supply of:—(a) Poles, (b) Arms, (c) Pins?
From what parts of the country did you get your past supply of:—(a) Poles, (b) Arms, (c) Pins?
 4. In your judgment, where will you get your future supplies of:—(a) Poles, (b) Arms, (c) Pins?
 5. Do you specify the time of year in which poles are to be cut?
 6. Do you season your poles before setting? If so, how long?
 7. Do you treat poles, arms, or pins with any preservative? If so, under what specifications?
 8. What is the average length of life of your poles?
 9. Are the factors which determine the necessity for replacing a pole in the line, (a) Wearing out of the pole? (b) Replacing with larger pole?
 10. Have you found it necessary to replace poles because of increased number of wires? If so, for what period did the original poles serve?

To any who make the request of the department, a printed form in which blank spaces are provided to fill in with the information will be sent and also a franked envelope for its return. We trust many will correspond with Mr. von Schrenk.

VERMONT INDEPENDENT MEETING.

A MEETING of the Independent telephone companies of northern and middle Vermont was held at Hardwick, Vermont, recently. Twenty officers were present, representing six companies. The Molly Falls Electric Company, with 120 telephones, and Union Company, 85 telephones, were represented. These two companies started last season and reach from Plainfield, through Cabot, Marshfield, Peacham, Calais, and Walden to West Danville. The Orange County Telephone Company reaches from White River Junction to Montpelier, with 1,000 telephones. This company has a territory of Montpelier, Barre and Northfield and other large towns and are pushers in the business. The McGuire Brothers, of Albany, have lines from Hardwick, north to Barton and Irasburg, with 350 telephones.

The Vermont People's Company, of Orleans County, has lines all through that county and north to Rock Island, P. Q., with 700 telephones. The Citizens' Telephone and Telegraph Exchange, of St. Johnsbury, have lines extending from Barton, south to Woodsville, N. H., with 700 telephones. Arrangements

were made at this meeting for the construction of a first-class trunk line from St. Johnsbury by Danville and Hardwick to Montpelier and so arranged that Montpelier can be called from St. Johnsbury direct.

TELEPHONE BILL IN SOUTH CAROLINA PASSES HOUSE.

UNDER the direction of Mr. Morgan, the house of the South Carolina legislature passed the senate bill to put telephone companies under the jurisdiction of the railroad commission. There was considerable discussion by both sides in the house before the vote and the Bell Company was accused of excessive lobbying.

NORTHERN INDIANA AND SOUTHERN MICHIGAN MEETING.

FORTY exchanges were represented in a joint meeting at South Bend, Ind., February 26th, of the managers of Independent telephone systems in northern Indiana and southern Michigan. The Northern Indiana and Southern Michigan Independent Toll Line Association was organized. South Bend was made the association's clearing house, under the direction of Theodore Thorward, president of the South Bend Home Telephone Company. Toll routes were mapped out and uniform rates established, showing generally radical cuts. The traffic committee appointed was: J. W. Scott, Warsaw; Claude R. Stoops, Nappanee; C. A. Reeve, Plymouth; J. K. Johnson, Elkhart; Theodore Thorward, South Bend. A second petition was forwarded to the manager of the Independent telephone company at Indianapolis, the New Long Distance, to establish toll connections with South Bend.

"PHONALARM" PROTECTIVE DEVICE.

RECENTLY the "Phonalarm," a new burglar protective device to be used in connection with existing telephone circuits, was shown at the offices of The Standard Protective Company, in the Electric Building, Cleveland, Ohio. Officials from the Cuyahoga Telephone Company and other telephone and business men interested in the device were present at the test. The system is so arranged in conjunction with the telephone circuits that when a door or window which is provided with the alarm is opened a signal is transmitted to the telephone exchange, and the police headquarters are therefrom communicated with. The company's arrangement is so delicate that when a pane of glass in a window is broken the alarm is transmitted. Mr. L. S. McCreary has charge of the company's offices. The first burglar captured by the "Phon Alarm" was caught in Rochester, N. Y., recently, the alarm coming over the wires of the Independent Telephone Company of that city.

COMPLETE TELEPHONE DIRECTORY OF CHICAGO AND VICINITY.

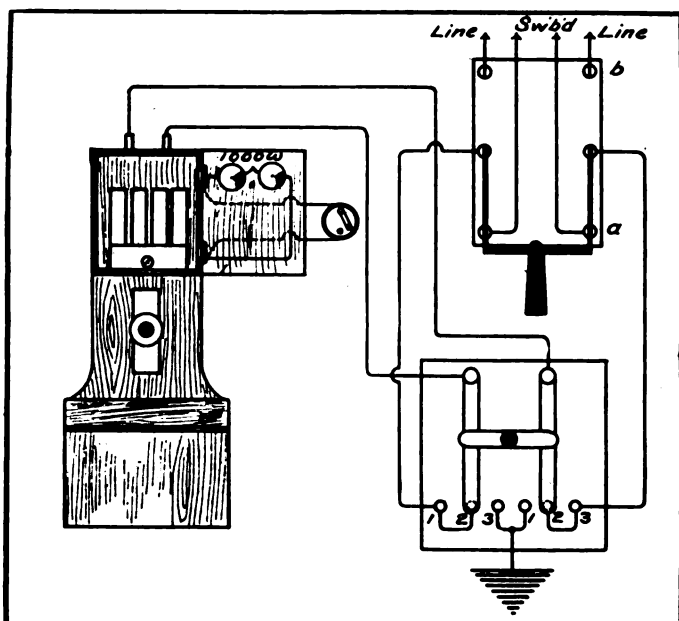
THE United States Telephone Directory Company has just issued a directory of Chicago, which is a curious and unique document in many respects. It compounds a list of all the subscribers served by the Chicago Telephone Company and the Illinois Telephone and Telegraph Company, so that it purports to

be a full list of all the telephone subscribers in Chicago and neighborhood. The directory remains in the title of the directory company, but is loaned to the subscriber, who is requested to return it upon the delivery of the next issue. Persons who are not regular telephone subscribers but who have access to telephones can have their names inserted in the directory with the same prominence as regular subscribers upon the payment of a small fee. The directory will be issued in January and July, with supplements in April and October. Extra copies are sold at \$1 each.

SIMPLE TESTING EQUIPMENT.

By C. L. Howk.

EVERY exchange should have some kind of testing apparatus. No one would think of trying to operate a large common battery exchange without a wire chief's desk, equipped with a voltmeter, bridge, and other testing devices. Any number of small exchanges can be found, however, where the testing outfit is limited to a lineman's test set. No matter how small an exchange is, there should be some convenient and quick way of testing the line and switchboard drop of any subscriber. The



apparatus described below has been used in an exchange of 500 magneto telephones for several years and proved invaluable. It consists of a series telephone, a double pole double throw baby knife switch, a pole changing switch, test plug and a single point switch.

A four-bar generator was installed in the telephone and a 1,000-ohm ringer replaced the low wound one. The switches can be mounted on the wall beside the telephone or a desk telephone used, and the switches mounted on the top of a desk or table. If a test plug can not be obtained from the manufacturer of the terminal, one can be easily made for most equipments. The ordinary suspender clip will do if nothing better can be obtained. Use lamp cord or a 4-wire flexible cord to connect the test plug to the switch, making it long enough to reach any point on the terminal. The double throw switch is used to test either the line or switchboard, the pole changing switch to test for grounds, opens, or shorts, and the telephone for talking to either the subscriber or operator. Connect as in the figure, and solder all connections possible making all others tight. To test a line in trouble, remove the fuses and insert the test plug which should be marked so that the same terminals will always be used for the line and switchboard sides respectively. Throw the knife switch to the *a* position, which is connected to the switchboard. Place the pole changing switch levers on points 2 2. This connects the test telephone direct with the switchboard drop and by turning the crank, a call can be sent in to the operator. Talk to the operator and have her ring back. If the drop is in good condition, it can be thrown with a quarter turn of the crank with the

1000-ohm bell in series. If it can not, short the bell with the one point switch and ring again. If the switchboard pair or drop are not short-circuited this will throw the drop.

Taking a piece of wire and grounding the drop shell, and by moving the pole changing switch to points 1 1 or 3 3, will show whether the drop is grounded. If the carbon blocks are on the switchboard side, any ground is liable to be in them. Throwing the double throw switch to position *b* will connect the line for testing. It can then be tested for short circuit ground, open or cross. It is well to bear in mind that a long cable pair has considerable capacity and it is easy to ring a 1000-ohm bell with a four-bar generator through this capacity. Any cutting out can be detected by listening. In ringing subscribers after finding that the line is O.K., short the 1000 bell. The main feature of this apparatus is its simplicity and that all tests can be made with the line and switchboard disconnected.

BALTIMORE FIRE DOES NOT INJURE UNDERGROUND.

INTERESTING facts relative to underground cable construction have been brought out by the recent Baltimore fire. Some of the underground cable companies have investigated the situation very carefully, and their findings are interesting. It has been found that the only injury to underground cables has been when the ends were exposed in buildings, and that the main conduit runs, although covered in many places with at least 20 feet of red-hot bricks, were not injured in the least. Two three-conductor high-tension transmission cables, which ran the entire length of the burned district through the very worst portion, remained in service continually at 13,000 volts pressure, and delivered current regularly to the street railway system. These cables were in the top tier ducts in all cases. It follows, therefore, that other cables—telephone, telegraph, etc.—which were further down must have got through the conflagration without injury. The conduit system in Baltimore is municipal.

INDEPENDENCE, MISSOURI, NEW PLANT.

RECENTLY the new exchange of the Home Telephone Company, of Independence, Mo., was opened. There are 400 subscribers connected. The service will be free until the line or toll service between Independence and Kansas City is completed and in operation. The Independence system will have long distance connections with all the lines reached by the Kansas City Home telephone system, which reaches the Independent lines of Missouri and Kansas. The line from Independence to Lee's Summit extends on through Sedalia to St. Louis. The company will also have long distance connections with the Eastern States. S. H. Woodson, of Independence, is president of the new company. J. S. Haley is resident manager and secretary. R. D. Mize, A. J. Bundschu and A. F. Sawyer are the other stockholders.

SELLERS, MO., TELEPHONE EXCHANGE.

IN the last year and a half the telephone exchange at Sellers, Mo., has made a remarkable growth. Though Sellers itself consists of nothing more than a post office, a store, a blacksmith's shop and the telephone exchange. The number of subscribers when the switchboard was installed was 25, and now there are over 125 subscribers on the exchange. There has been more construction done lately and a general overhauling of all lines has been completed. J. R. Sellers intends to build a line from Sellers to Monticello, the county seat. Other improvements will be made, and there is talk of a new line being built into Sellers from the north.

OHIO AND INDIANA ALMOST CONNECTED.

THE intercommunication of Ohio and Indiana Independent telephones now lacks only the connecting link through the exchange at Richmond, Ind., near which city the United States Long Distance Telephone Company, the big Independent toll line company, is drawing its lines.



A "MICHIGAN BELL" REPETITION.

THE AMERICAN TELEPHONE JOURNAL has had frequent occasion to refer to the Boston News Bureau, one of the most persistent and imaginative purveyors of fiction which we have in the country. It is difficult to know just when to believe this News Bureau, which has the distinction of being the official voice of the great Bell monopoly. Sometimes, no doubt, there is a grain of truth in the statements which emanate from this interesting source, and occasionally there is a world of significance when one is able to read between the lines.

For instance, the Boston News Bureau has this from a telephone official—Bell official, of course:

"With Bell stock selling at \$126, it is quite probable that the new money will be raised by bond issues instead of selling a 7½ per cent. stock at par. Based upon the recent sale of Atchison bonds and the fact that all the Bell bonds previously issued have been distributed, the company ought to be able to market a block of \$25,000,000 to net above 90, basing the rate fixed to be 4 per cent., a saving of, say, 3 per cent., or \$750,000 annually."

The paragraph refers to the money needed for the proposed active campaign to be waged against the Independents in the territory of the Central Union and the Western Telephone and Telegraph Companies. It is desired to put the latter companies upon a competitive basis and to keep the Independents away from Chicago, toward which city they are looking.

There is no questioning the fact that the Central Union property needs improvement on a large scale, if the company expects to even hold its own in the struggle with the Independents. Next spring, however, will be a little late to prevent the Independents from getting a foothold in Chicago. So much for the truth of the statement. The significance of it is far more interesting. Is it possible that with the American Bell Company is about to be repeated on a large scale what was so thoroughly accomplished in the case of the Michigan Telephone Company in the State of Michigan? Is history about to repeat itself? The misfortunes of the Michigan Telephone Company are of such recent occurrence they are still fresh in the public mind. All the money possible was raised from the stock of the concern. The property gradually depreciated and became antiquated, utterly unable to compete with the up-to-date Independent equipment. Then came bond issues, and later the unfortunate stockholders were systematically and thoroughly wiped out. It was too bad. The bondholders regretted exceedingly that the innocent stockholder should suffer, and attributed all his misfortunes to the reckless and wasteful methods of those in charge. They then proceeded to reorganize the company and capitalize it in stocks and bonds at \$20,000,000, although the Bell interests considered the property worth only \$4,000,000.

This seems to be what is taking place in the territory of the Central Union. Entering the field with the most modern equipment which money could buy, the Independents were able to make great inroads into the business of the Bell concern with its antiquated property. Satisfactory service is not given to patrons

BOSTON NEWS BUREAU MISSTATEMENTS.

of the Bell company. The stock of the company, cut in two, is still below par. The stockholders have been milked dry. It is no longer possible to raise money by an issue of stock. The company is bonded up to the limit. A Chicago connection is all that is necessary to make the Independents supreme in long distance as they already are in local service.

At this interesting and pathetic moment the American Telephone & Telegraph Company comes to the rescue of its offspring, and it is decided to bond the company for from \$25,000,000 to \$30,000,000 in addition to the bonds already outstanding. With the fate of the Michigan company in mind, we may expect the next steps to be a receivership and a foreclosure. The stockholders will pocket their losses and the bondholders will come into possession of a property which is very valuable in spite of reckless methods and extravagant law suits. The bondholders will regret exceedingly the necessity for such a proceeding, "but really the company had long been bankrupt, don't you know, and there was no other recourse." Then the Boston News Bureau will explain how it all happened in its own luminous and highly imaginative way, and will let the innocent stockholders down as easily as possible.

Perhaps some of the troubles of these same stockholders will result from a too implicit trust in the figures and statements from this inspired News Bureau. According to no less an authority than William A. Jackson, who was consulting expert for the Union Trust Company during the Michigan receivership, and who will be president of the new company to be erected on the ruins of the old, the figures published by the Boston News Bureau on the earnings of the Michigan Telephone Company during the past two years are all wrong and convey a wrong impression. He says, among other things, that instead of net earnings of \$311,822 for the year 1902, as stated by the Boston News Bureau, the company actually lost in that same year \$200,000. This was the year before the Union Trust Company was appointed receiver.

Another statement denied by Mr. Jackson was that \$1,908,275 had been expended by the receiver in improvements and betterments since March, 1903. The actual amount, according to Mr. Jackson, was \$362,000. Here is a difference of over a million and a half dollars, which is perhaps as near as we can hope to get at the truth when the Bureau is engaged in its favorite pastime of throwing dust in the eyes of the Bell stockholders and blinding them to actual conditions.

The whole affair has another significance, and that is the implied recognition of the once despised Independents. It is something, after all, to have an inspired Bell organ, which has so persistently belittled the Independent movement from the first, in order to deceive Bell stockholders and scare capital, admit even in a roundabout way that the Independents have invaded the Middle West so successfully that \$25,000,000 is necessary to repair the mischief done.

AN INEXPENSIVE TESTING SET

By ARTHUR KNEISEL.

IN the average small exchange there is usually a dearth of testing apparatus, and where directors fail to see the advantage of having a voltmeter for such purposes, a good set can be arranged from material laying idle about an exchange.

A double pole double throw knife switch, one ringing and listening key, a one-way key, one relay, a 20-volt switchboard lamp, a desk stand, one 1000-ohm bell and an 80-ohm bell are necessary for a circuit which I have used on several occasions and found very efficient

20-volt lamp burn. By throwing the key *C* the two sides of the line are reversed, which will show whether the line is clear on the "dead" side.

A clear line will show no signal. To call the subscriber, the key *B* is thrown into the ringing position and, unless the line is open the 80-ohm bell will ring. When the subscriber answers, in closing the circuit at his hook connection, he causes the relay to bring in the signal. The key *B* is then thrown in the listening

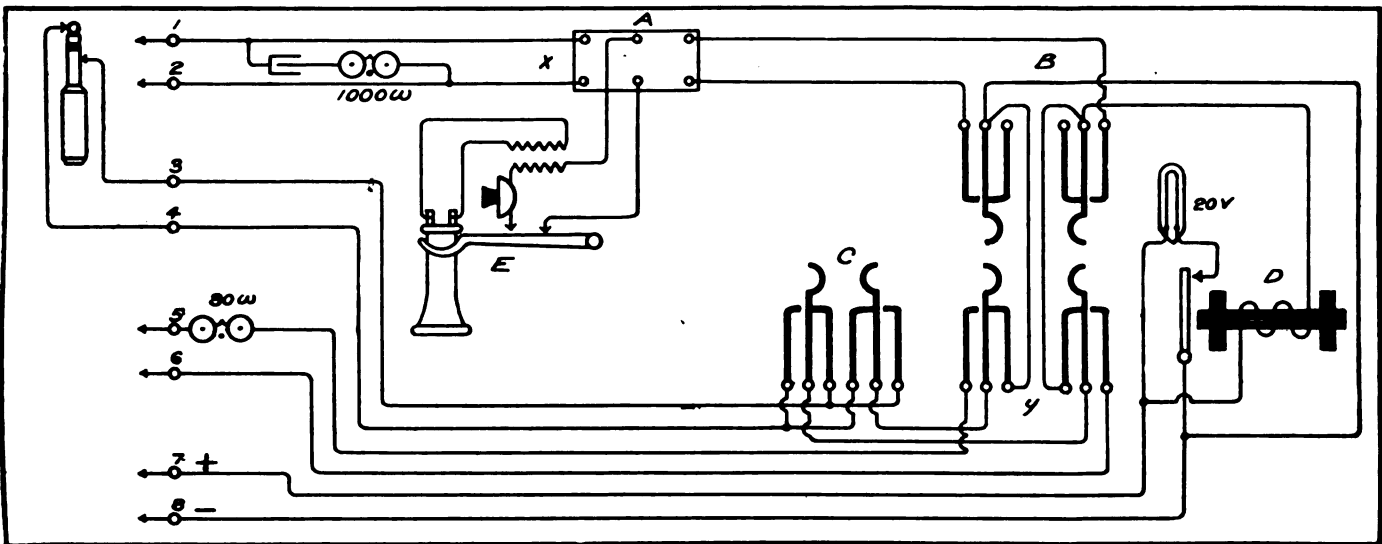


Fig. 1. Diagram of Circuits of an Easily Arranged Testing Set for a Small Exchange.

in testing for all ordinary cases of trouble. In Fig 1 is a line connecting two contacts of the knife switch *A* to the switchboard like any subscriber's line. The 1000-ohm bell with a condenser in series (a desk set bell) are bridged across this line. A call for the wire chief from the switchboard will ring this bell. To answer the call the knife switch is thrown toward *x*, thereby connecting the desk stand *E* with the line. By this arrangement the wire chief is enabled to call or be called by any subscriber connected with the exchange.

At 3-4 is a line to a test plug, which is a switchboard cord at the operator's position terminating in an ordinary plug, or it may

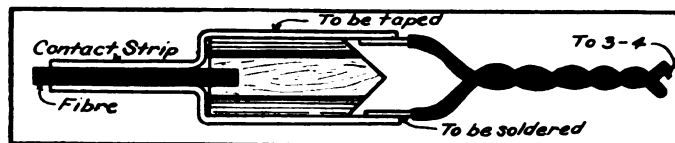


Fig. 2. A Home Made Testing Plug.

be a horseshoe testing plug at the arrester rack. 5 and 6 are the generator leads which run to the outer contacts of key *B* at the end *y*. The 80-ohm bell is cut in one side of this line, as shown. 7 and 8 are the 20-volt battery leads, one side being grounded. *B* is the ringing and listening key and *C* the one-way key. *D* is a line relay of the same type as is used in the exchange. The key *C* is for the purpose of reversing the two sides of the line being tested.

To test a line with this set, the wire chief throws the switch *A* toward *x* and takes down his receiver, thereby connecting his desk stand with his exchange line. He orders his operator, who also has the test plug on her position, to "plug up" the line to be tested, which she does by inserting the test plug into the multiple jack. The wire chief then throws the knife switch in the direction opposite to *x* and hangs up. Should the line be crossed out or grounded on the "live" side, the relay *D* will be energized and the

position, and the receiver of the desk stand *E* removed, when the set is ready for conversation.

In exchanges where one side of the generator is grounded for two-party line purposes, the key *c* will serve as a party line key. In this case the 80-ohm bell must be cut in the live side of the generator leads. With the key *C* in its normal position, throwing the key *B* in the ringing position will ring all bells bridged from that side to ground. If the key *c* is thrown before the generator key all bells on the opposite side will be rung. In both cases the 80-ohm bell will ring provided the circuit through the bells to ground is complete.

This set will be found very useful in larger exchanges where linemen call in and test conductors through cables before using them. For this service the wires 3-4 would run to the terminal rack and terminate in eyeloops or some form of plug. A convenient form of plug for this purpose which I have found in exchanges, where the terminal rack is vertical, can be made of an old switchboard lamp by breaking away the glass and bending the contact strips together and placing a layer of fiber or hard rubber between them, as shown in Fig. 2. The test wires can be soldered to these contact points and the connections taped.

The plug is used by inserting it between the two springs on the rack, letting the weight of the test wires hold it in place while the test is made as above. With the 80-ohm bell in series with the generator to test for open circuits, the reversing key and relay to test for short circuits or ring party lines, we have all the tests necessary in an ordinary common battery exchange.

CALLED AT THE WRONG TIME.

CHARLES ALEXANDER, indicted for larceny at Franklin, Ind., jumped his bond and disappeared. He remained away two years, came back to Terre Haute and called up the judge of the Circuit Court by telephone and asked if his case had been dismissed. The judge notified Sheriff Baldwin, who went after and rearrested him.

THE TELEPHONE IN THE COURTS

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

EFFECT OF SUBSEQUENT INCORPORATION OF TOWN.

A TELEPHONE company secures a franchise from the Board of County Commissioners to operate its lines over the streets and alleys of a town. When the town subsequently incorporates what rights in New Mexico does the company maintain under its franchise from the county?

H. O. L.

THE franchise was a contract between the county and your company, *City Ry. Co. vs. Citizens' St. Ry. Co.*, 166 U. S. 557. The subsequent incorporation of the town does not deprive your company of its rights under its franchise. The town must recognize the franchise and permit you to operate your line just as you did previous to its incorporation. *White vs. Fuller*, 38 Vt. 193. *Mt. Pleasant vs. Beckwith*, 100 U. S. 514. This is true in the absence of any constitutional or statutory provision or any reservation in the franchise itself authorizing a repeal or modification of the franchise, or providing for the contingency of the town's incorporation. *Lewis vs. City of Newton*, 75 F. 884. You will be subject to such reasonable police regulations as the town may enact for the operation of your system.

CROSSING LINES IN NEW YORK.

I WISH to inquire what the law is in New York State in regard to one party building a line which crosses the line of another party. Must they go above or below, and what clearance must they give the existing line?

THERE is no hard and fast rule on the subject. The company that builds last must construct its line so as not to interfere with the already existing line. In a Minnesota case it was held that the underbuilding there complained of was interference. *N. W. Teleph. Exch. Co. vs. Twin City Teleph. Co.*, 95 N. W. 460. On the other hand, overbuilding has been approved as a proper method of construction. *Chicago Teleph. Co. vs. N. W. Teleph. Co.*, 65 N. E. 329. 8 Am. Teleph. Jour. 12 (No. 1). I should advise going above and giving about five feet clearance unless there are peculiar local conditions that would justify other arrangements.

CHARGES WHEN PARTY CALLED IS NOT FOUND.

WHEN a party calls for another party over a long distance wire, through several exchanges, and the party called cannot be found, would there be any charge to the party that calls?

THIS is a matter of policy instead of law. If the company has a regulation that a party who calls for another over a long distance wire through several exchanges must pay a fee even though the party sought cannot be found, the company can collect a charge. Otherwise it cannot. Such rules are unusual.

DUTY OF CARE TO ALL PERSONS USING THE CURRENT.

IN a recent Southern case a building contractor was sued by a publishing company for negligently breaking wires in an underground conduit. These wires did not belong to the publishing company but to an electric company that was under contract to furnish power to the publishing company. The court held the defendant free from liability on the ground that there were no contract relations between the parties to the suit, and that the damage of which the plaintiff complained was due to a breach of contract by the electric company a third party. *Byrd vs. English*, 117 Ga. 191. The decision is discussed in the Harvard Law Re-

view (Vol. 17, p. 288), the article implying that the defendant owed a duty of care, not only to the owner of the wire but to all persons using the current. The establishment of such a rule would be of advantage to telephone companies in cases where they are sued for failure of service when the failure is due to negligent acts of third persons. It would direct litigation toward the real wrongdoers and in many cases relieve the companies.

WIRES OF TRACTION AND TELEPHONE COMPANIES.

THE new Long Distance Telephone Company of Lebanon, Ind., sued Townsend, Reed & Co., asking an injunction to restrain the defendant from stringing their trolley wires in such a way as to interfere with the telephone company's wires. The circuit court denied the injunction. It held that where a traction company had to string its wires in a certain way telephone companies are required to change their wires to conform thereto, in case of interference. He also held that when a telephone company is compelled to make such changes it can collect from the traction company the necessary expenses of making the change. In other words, the telephone company cannot by injunction prevent the traction company stringing its wires but must sue the traction company for the damages incurred.

TAX OF \$1 PER POLE REASONABLE IN CITY.

A LICENSE fee of \$1 per pole has been upheld as reasonable by the United States Circuit Court at Philadelphia. The case of *Postal Telegraph-Cable Company vs. Borough of Taylor*, referred to in this department last week, was cited by the company. It held that a fee of \$1 per pole was excessive. The Circuit Court declared, however, that fees that might be excessive for a borough would not necessarily be so for a larger city.

INJUNCTION AND CROSS-INJUNCTION.

THE Mutual Telephone Company and the New York & Pennsylvania Telephone Company have begun a legal battle at Erie, Pa. The former secured an injunction against the latter, restraining it from interfering with and cutting the complainant's wires. The defendant filed a cross bill in the suit, alleging that it was the first occupant of the space where the interference was alleged to have happened, and that the Mutual Company strung its wires through the space occupied by the defendant between its lowest and highest crossarms, and was threatening to cut its wires. On this showing an injunction was granted the New York & Pennsylvania Company, restraining the Mutual Company from interference.

MANDAMUS TO COMMON COUNCIL.

THE Tri-State Telegraph and Telephone Company has commenced suit for mandamus against the city council of Owatonna, Minn., to compel it to designate a route by which the company may extend its line through the city. The company alleges that the city has no power to keep the company out of the city, and is under the duty of indicating the route it shall follow. The petition charges that the failure of the council to act is due to favoritism towards the North Western Telephone Company, which already occupies the town.

QUERIES

Questions on any subject relating to the technical side of telephony will be answered in this column.

CROSS THROWS LINE OUT.—(290.)

We have a line which is composed of two old lines connected together to make one line, the conditions being shown in the drawing, Fig. 290. I had a cross at A. The leads to the telephone were whipped together, making a good short circuit. From the switchboard I could ring telephone No. 1 and it the switchboard and a good conversation could be carried on it, but neither switchboard nor telephone No. 1 could get any other party on line. At telephone No. 5 I could call up No. 4 easily, but the transmission was not good, the line being noisy, but I could talk so as to be understood. I stopped at No. 4 on my return and could ring no one toward the switchboard but could ring No. 5. At Nos. 3 and 2 the bells would not work at

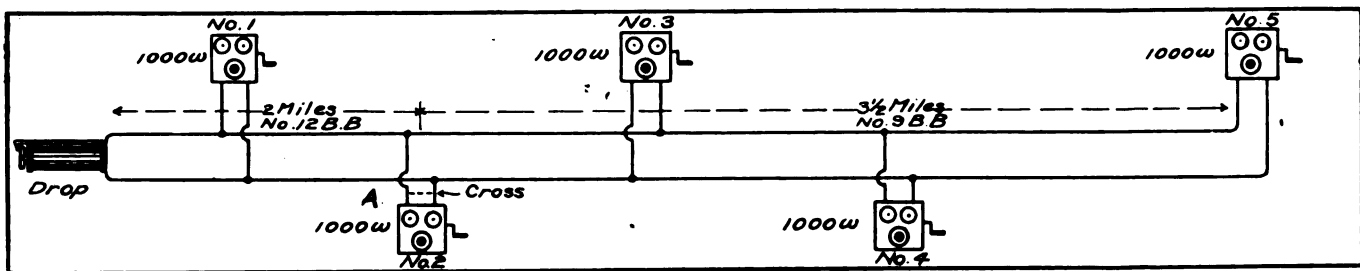


Figure 290.

all. Instruments are bridging. Now according to all books I have read, with this cross it would throw the whole line out. How do you account for it? I think it is because the resistance between telephones No. 4 and 5 and switchboard and No. 1 is less than to the cross, thus the cross simply acting as a high resistance, the same as a high wound bell, but as you get closer to the cross your resistance decreases. D. F.

We consider that the explanation which you offer for the operation of a line such as you describe is essentially correct. The cross had undoubtedly sufficient resistance to cause the bells on either side of it to ring, and yet sufficiently conductive so that the line you use is short-circuited. Many causes might appear to prevent the intermediate bells from ringing, and without more knowledge of the exact conditions it would be impossible to specify what was the actual reason.

RESISTANCE OF WIRE CUBE.—(291.)

Will you please give me information how to determine the resistance of the cube of wire shown in Fig. 291, from A to B, with resistance as marked? J. A. R.

To work out the complete solution of the problem which you propose, transcends the limits of the query column. The method, however, is as follows: Suppose in Fig. 2 that four conductors, R_1 , R_2 , R_3 and R_4 ; R_1 and R_2 being in series with R and R_3 . To determine the resistance under these conditions it is necessary to find the joint resistances of R_1 and R_2 and add it to the resistance of R and R_3 . Where two or more conductors are in parallel with each other the resistance is the reciprocal of the sum of the reciprocal by each of the separate conductors. Thus the joint resistance of R_1 and R_2 is $\frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$ and the total resistance of the

circuit is $R + \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} + R_3$. If you will take the cube which you

illustrated and trace all of the possible circuits from A to B, and solve each one of these circuits with the above equation you will obtain the answer you desire.

TRANSMITTER BATTERY QUESTIONS.—(292.)

(1) How long will a 100 hour ampere hour Gordon battery last without renewal on a switchboard transmitter of 80 ohms resistance? Please give formula for finding answer.

(2) Would a 300 ampere hour Gordon battery be more suitable for this work? If not, why not?

(3) Why will not a dry battery (said to have an amperage of from 12 to 16) melt a $\frac{1}{4}$ ampere fuse?

(1) To determine how long a 100-ampere hour battery will last connected to an 80-ohm transmitter the common formula $C = \frac{E}{R}$ should be used. In the case specified, the Gordon battery has an electromotive force of about .65 volts, and assuming that the rest of the circuit has a resistance of more than 10 ohms, the formula would stand as follows: $C = \frac{.65}{90} = .0065$ ampere. That is to say that current flowing would be a little over 6/1000 of

an ampere. Therefore in one hour 65/10000 of an ampere would flow, and if the battery has a capacity of 100 ampere hours this current would be maintained for 15,000 hours, or roughly, about two years. This is theoretical, and fails to take into consideration the fact that the resistance of the transmitter will vary from time to time through very wide limits, and that in all probability much of the time the resistance of the transmitter would be very much less than 80 ohms. It is rare to find transmitters that are built with so high a resistance. The voltage of one Gordon cell is too small to give first-class results with transmitters, as in order to obtain the best service a number of such cells must be united in service. Then as the battery becomes exhausted, the voltage falls and the service becomes still more undesirable.

(2) The 300-ampere hour cell is no more and no less suitable than the one-ampere cell; the only difference is that as the 300-ampere hour cell has a greater capacity it will last correspondingly longer. It must also be recollected that there is more or less local action in primary batteries which tends to exhaust their capacity sooner than would be theoretically probable.

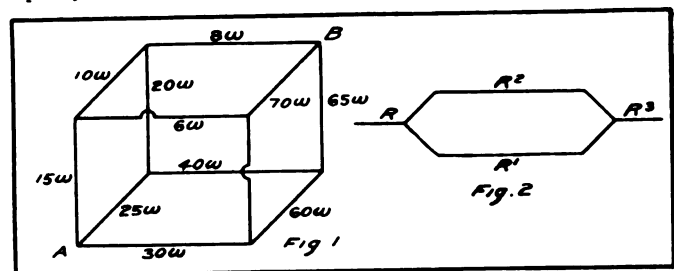


Figure 291.

(4) If in this query the phraseology "amperage of from 12 to 16," means that the dry battery will give from 12 to 16 amperes, it is quite certain that either the fuse is more than a quarter of an ampere, or that the capacity of the battery is overrated or that there is other resistance in the circuit; it is quite possible that all of these causes operate. It is almost certain that no single-cell or dry battery will discharge as much as 12 or 16 amperes.

REPEATING COILS FOR TALKING.—(293.)

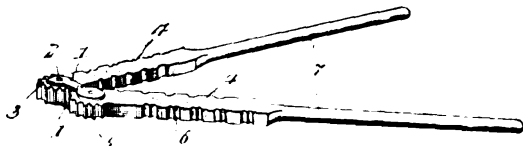
Are repeating coils (for talking only) entirely successful in connecting metallic and grounded lines? N. E. C.

As no human appliances are perfect, repeating coils inserted between grounded and metallic lines can be said to be entirely successful, their use improving service to such extent that their presence is considered desirable.

PATENTS ISSUED

IMPROVED WIRE CLAMP.

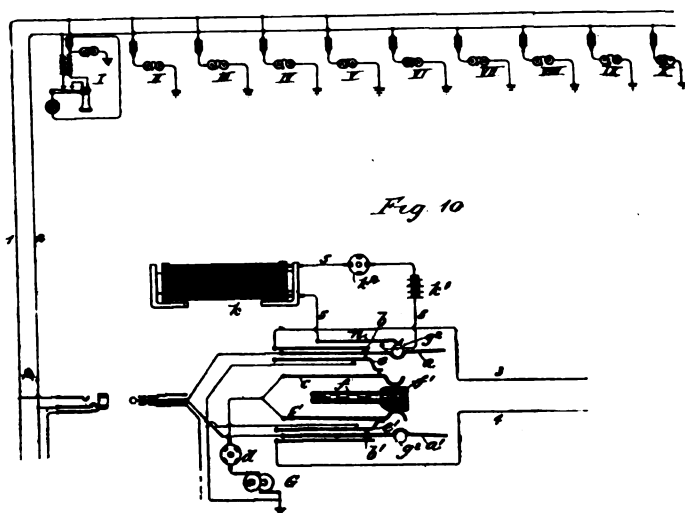
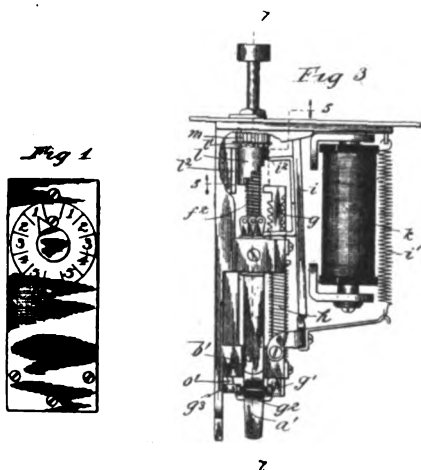
R. L. Sehon patents (No. 751,352) an improved clamp for making wire joints. This is illustrated in the figure. The inventor provides two arms, 7, which are corrugated, as at 4 and 6. The cor-



rugations 4 being on one side and the 6 at each side of each arm. These corrugations are exactly interchangeable. The end of each arm is furnished with a rack, and consequently the arms may be reversed, and yet the corrugations will register with each other.

IMPROVED PARTY LINE RINGING KEY.

C. E. Scribner, Chicago, Ill., patents (No. 751,566) and assigns to the Western Electric Company, an improved party line ringing key, and F. R. McBerty, of Evanston, Ill., patents (No. 751,539) and assigns to the Western Electric Company, an improved party line ringing key. These two patents have the same object

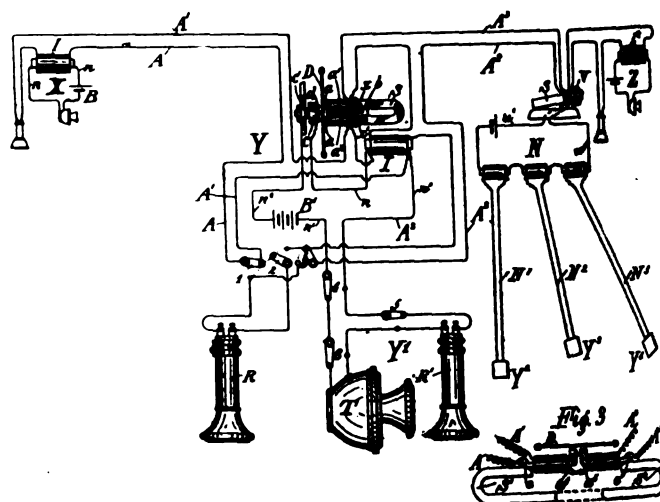


and employ a mechanism and a means of accomplishing it that are so much the same that a single description will suffice for both. The object of this invention is to provide a ringing key whereby the operator may transmit to a party line any form of code ring such as a varying number of rings of long or short rings, at pleasure, without the necessity of pressing the ringing key a number of times, and to provide the operator with a method whereby she may keep tab upon the subscribers' call, so that in case of repeating the ring, it may be done without con-

fusion. A plan view of the key is shown in Fig. 1, and a side elevation in Fig. 3, and the circuit in Fig. 10. The key is provided with a button 7, which carries an indicator. This indicator plays over the guide plate shown in Fig. 1. The graduations indicate the number of rings that will be thrown on the line. The various apparatus are grouped half upon one side and half upon the other side of the line. By turning the handle 7, so that the indicator plays over the left hand side of the guide plate the operator rings usually upon the tip of the line. By turning the handle in the other direction, she can ring upon the sleeve. The handle of the button 7 is provided with a sleeve L cut into steps. There are as many steps as there are parties on each side of the line. The electromagnet K forms the portion of the releasing mechanism. When the operator presses the key 7 after it has been turned so that the pointer is set opposite any number on the escutcheon plate, the distance which she can depress the handle is limited by the steps cut by the ring L. As soon as the operator removes her hand from the key the releasing mechanism commences to operate and allows the key to rise by successive steps. Each step causes a ring as can readily be seen by tracing the circuit in Fig. 10. Thus the work of the operator is limited to setting the point of the key opposite the proper number and pressing the button.

TELEPHONE REPEATER.

Merritt Gally, Brooklyn, N. Y., patents (No. 751,845) an improved telephonic repeating system. This invention is a development of a telephonic repeater patented by the same inventor March 18, 1903, already noticed in our columns. The object of the patent is to cover a complete system, of which the present patent applies only to the repeater mechanism. This invention is illus-

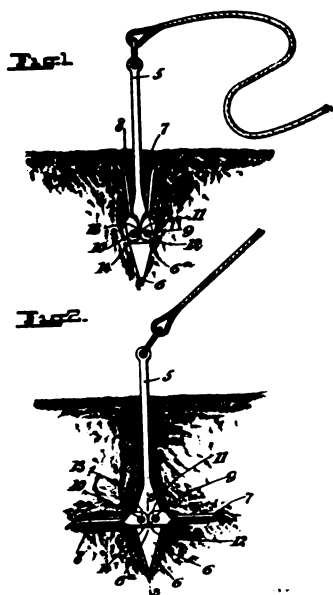


trated in the figure, in which X Y' and Z are telephone substations and Y the station containing the receiver. These substations and their connecting lines may be of any ordinary type. The repeating station is shown at Y. At stations Y' is a microphone-transmitter, T in a primary circuit, n' with battery B'. This primary circuit passes through the primary wire of the induction coil I. The transmitter T, can be thrown into the primary circuit n' at will for use on either of the main lines from station Y by means of the switches 4 and 6, or can be cut out if desired. The induction coil I has two secondary wires wound together. One of the secondary wires leads to the main line A A', and the other secondary wire leads to the main line A2 A3. The two spools, a', a'' of the repeater-magnet, are wound doubly, the two wires leading separately each one to its main line, one winding of each spool passing into the other spool in the double winding. When the two wires are thus wound together, the coils act in exact harmony upon the repeating transmitter D c c', while it is

reinforcing the main line by means of battery *B'* through the induction coil *I*, which also has two windings in the secondary leading to the two lines. The diaphragm is perfectly insulated from the button-electrode *d*. The impulses of the receiving-magnet, diaphragm, and the induction coils are instant and practically simultaneous.

GUY ANCHOR.

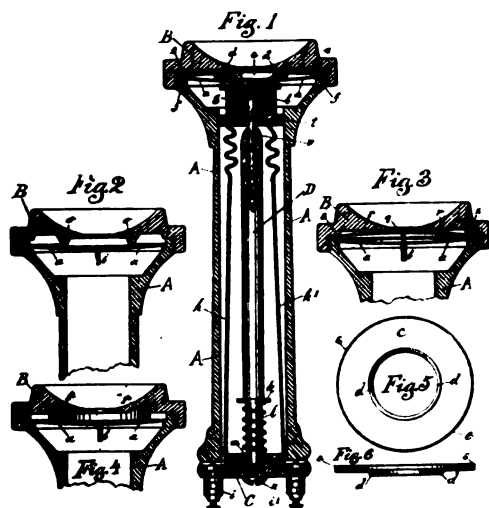
W. G. Beach, of Grandlake, Ark., patents (No. 705,151) an improved form of guy anchor. This invention is shown in Figs. 1



and 2, from which it appears that there is a bar 5 which is bolted on one end of the pin 6, and on the other end carries a ring by which the guy wire can be attached upon the flattened portion 6 of the bar 5. Two wings, 11 and 13, are attached by means of the pivots 9 and 10. These are so arranged that when the bar is driven longitudinally into the earth, it is easily turned into the ground. The wings turn outwards and hold the anchor firmly.

TELEPHONE RECEIVER.

E. Gundlach, of Western Springs, Ill., patents (No. 751,501) an improved telephone receiver. The object of this invention is to provide an improved magnetic system, and a method of

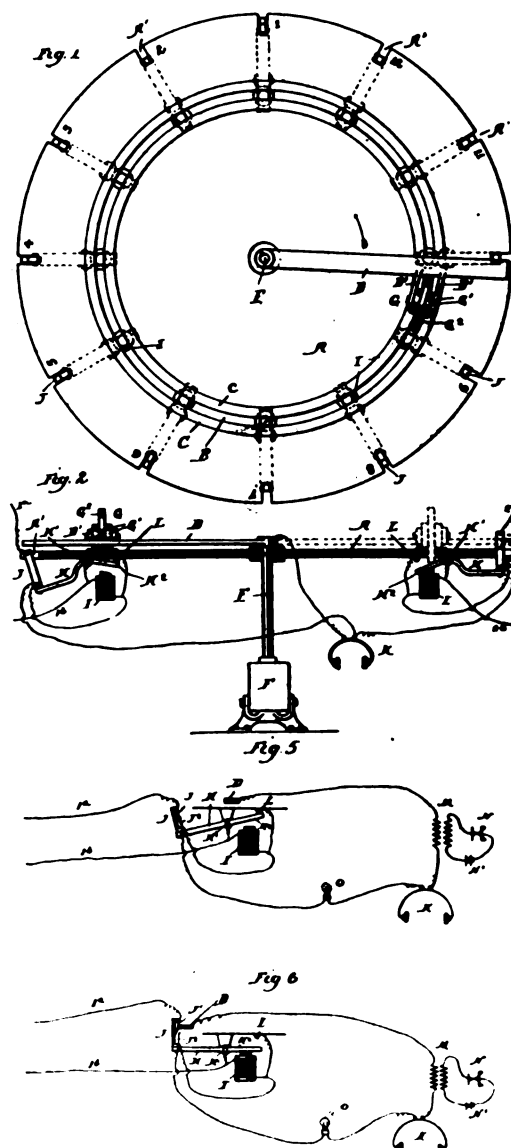


giving the diaphragm an initial tension. The invention is illustrated in Figs. 1 to 6, inclusive. In Fig. 1, *A* is the ordinary rubber case in which the permanent magnet *D* is secured by means of a screw *n*, and held in place by a spring *L*. Into the end of this magnet a hole is bored and a soft iron pin, forming the

pole piece *v*, inserted. Around this pole piece the coil *g* is wound. On top of the diaphragm the so-called tension spring, made of dished aluminum, as shown in Fig. 5, is placed. When the cap *B*, forces this spring in contact with the diaphragm, it presses it inwards towards the magnet, as shown in Fig. 1. In the center of the diaphragm a small soft iron pole piece *B*, is placed.

IMPROVED TELEPHONIC SYSTEM.

Isidor Kitsee, of Philadelphia, Pa., patents (No. 751,655) an improvement in telephone systems which relates particularly to the method for subscribers to transmit signals to the central office. The object of this invention is to provide such mechanism as shall enable the operator to determine the order in which the subscribers call, so that they may be served with regularity. This invention is shown in plan in Fig. 1, in section in Fig. 2, and the circuit in Figs. 5 and 6. The inventor provides a disc *A*, having a pivot *E* in the center, which carries the arm *D*. This



arm is supplied with a roller *G*, which travels around a circular track *CC*. The arm *E*, is rotated by means of a motor *F*, and consequently is constantly traveling 'round and 'round the plate *A*. Underneath the plate is a magnet *I*, which is connected to the subscribers' line cord to the circuits shown in Figs. 5 and 6. Above this magnet, an armature *H*, is pivoted which carries a projection *J*. When the subscriber removes the telephone from the hook the magnet *I* is excited, the armature *H* attracted and the portion *J* extended above the plate *E*. This arrests the motion of the arm *D*. By this motion the operator can be noted of the exact rotation in which the subscribers called.



FINANCIAL

VINTON, IA.—The Farmers Telephone Company has increased its capital stock from \$2,000 to \$10,000.

WILLMAR, MINN.—The Minnesota Central Telephone Company has declared a dividend of 10 per cent. and decided to spend a large amount of money to provide satisfactory facilities for handling the increasing business of the company.

ST. LOUIS, MO.—The Kinloch Long Distance Telephone Company, of Missouri, has increased its capital stock to \$5,000,000.

SYRACUSE, N. Y.—It is stated that the Syracuse Telephone Company will soon issue bonds to the extent of \$400,000, to practically reconstruct its system in this city. A. A. Howlett is secretary, treasurer and general manager of the company.

DAYTON, O.—The Home Telephone Company has increased its capital stock from \$600,000 to \$1,000,000.

HICKSVILLE, O.—The Hicksville Telephone Company has increased its capital stock from \$25,000 to \$40,000. John Blosser is president.

TONKAWA, OKLA.—The Farmers Mutual Telephone Company, of Tonkawa, has increased its capital stock from \$2,500 to \$10,000.

FRANCHISES.

SUMMITVILLE, IND.—Robert W. Inglis, of Summitville, has been granted a franchise for a telephone system in Boone and Van Buren Townships.

MONROE, IA.—The Reasnor Telephone Company has been granted a franchise here.

WALNUT, IA.—The Marne and Elkhorn Telephone Company has asked the city council for a franchise to build its line into Walnut.

JETMORE, KAN.—A franchise has been granted to the Jetmore Telephone Company, consisting of C. W. Teed, T. L. McDowell and Roscoe H. Wilson.

SKOWHEGAN, ME.—The People's Independent Telephone Company has applied for a franchise to construct a system here.

ASHLEY, MO.—The Star Telephone Company has been granted a franchise to construct a line from Ashley to New Hartford.

NEW HARTFORD, MO.—The New Hartford and Corso Telephone Company has been granted a franchise to extend a telephone line from New Hartford to the Lincoln County line.

AUSTINBURG, O.—The Austinburg Telephone Company, promoted by G. W. Mooney, of this city, and W. B. Cook, of Geneva, is securing right-of-way from this place to Geneva, and will ask the city of Geneva for a local franchise.

CLEVELAND, O.—The Cuyahoga Telephone Company has been granted a franchise to construct a system at Lakewood.

BLACKWELL, OKLA.—The Farmers Telephone Company has asked the city council of Blackwell for a franchise.

MITCHELL, S. D.—The Citizens Telephone Company organized by F. H. Winsor, George H. Rew, D. A. Mizener, T. J. Spangler, J. O. Walrath, A. B. Hager and T. C. Burns, has asked for a franchise here.

RICE LAKE, WIS.—Eau Claire people in connection with local citizens, are considering a proposition to ask a franchise of the local city council for an Independent telephone system.

ELECTIONS

FORT MORGAN, COLO.—The Fort Morgan County Independent Telephone Company has elected W. H. Clatworthy, president; R. M. Hancy, secretary; Arthur Hotchkiss, Jr., treasurer; L. C. Stephenson, general manager, and changed its headquarters from Greeley to this place.

LADORA, IA.—The Ladora County Mutual Telephone Company has elected J. N. Shedenhelm, of Ladora, president; M. A. Wright, Ladora, vice-president; W. M. Blair, Marengo, R. No. 2, secretary; W. G. Blair, Ladora, treasurer. A. A. McGivern, Marengo, and J. B. Retz and J. Henry Kopping, of Ladora, directors.

OWENSBORO, KY.—The Home Telephone Company has elected J. W. Slaughter, president; J. W. Carter, vice-president; H. K. Cole, secretary and general manager; James H. Parrish, treasurer. Plans for increasing the equipment of the exchange about 50 per cent. were approved and ordered carried into effect.

MANKATO, MINN.—The Mankato and Rapidan Telephone Company has elected Fred O. True, president; A. L. Veigel, vice-president; C. C. Johnson, secretary, and William Jamieson, treasurer.

NEW KINGSTON, N. Y.—The Bovina and Middletown Telephone Company, at a meeting held here, elected J. W. Elliott, W. F. Du Mond, Charles D. Sanford, Henry Hitt, William D. Winter, J. B. Archibald and Sinclair Archibald, directors.

POULTENEY, N. Y.—The Keuka & Poulteney Telephone Company has elected Benj. M. Hart, president; J. F. Pepper, vice-president; Fred Culver, secretary and treasurer.

SIDNEY, N. Y.—The Union Telephone Company has elected L. M. Siver, president; D. R. Buckley, vice-president; Robert W. Siver, secretary and treasurer.

MARIETTA, O.—The Marietta Telephone Company has elected A. L. Garcey, president; J. S. H. Torner, vice-president; F. P. Moats, treasurer; A. C. Davis, secretary and general manager.

PHALANX, O.—The Phalanx and Leavittsburg Telephone Company has elected R. F. Templeton, president and general manager; J. C. McConnell, vice-president; A. M. Rood, secretary and treasurer. The line will be further extended the coming year.

EL RENO, OKLA.—The Topeka and El Reno Telephone Company has elected C. O. Blake, president; W. F. Evans, vice-president; F. H. Wright, treasurer, and George W. Bellamy, secretary.

MORGANTOWN, PA.—The Conestoga Telephone and Telegraph Company, at a meeting held here, elected M. H. Hertzler, president; Jacob Hartz, vice-president and secretary; H. B. Best, treasurer and general superintendent.

PERSONAL

GARRISON BABCOCK has left the employ of the Stromberg-Carlson Manufacturing Company to enter the construction field, and is now located at No. 38 Rowley street, Rochester, N. Y.

M. R. KENNEDY, who has been employed by the M. & L. Telephone Company for several years, has gone to Louisiana, Mo., to accept a position with the Buffum Telephone Company, as manager of the exchange at Fulton, Mo.

FREDERICK D. MAC MASTER, formerly with the Library Bureau, of Chicago, will represent The Vought-Berger Company in the State of Minnesota, making his headquarters at Minneapolis.

A. MEINEMA, who has for the past four years represented the M. B. Austin Company, of Chicago, in the State of Wisconsin, has accepted a position with The Vought-Berger Company and will represent it in the Northwest, with headquarters at Chicago. Mr. Meinema, together with his brother, Mr. J. Meinema, of the same company, started February 15th for Cuba, where they will spend a month in the interests of the company.

GEORGE H. PIERCE, formerly the New York State representative of the Stromberg-Carlson Telephone Manufacturing Company, has recently accepted a position with The Vought-Berger Company, of La Crosse, Wis., and will represent that company in the State of Iowa. His headquarters will be in Des Moines, No. 600 5th street, where he will carry a small stock of telephones for immediate shipments, and a switchboard or two in readiness for emergency orders in cases of accident or disaster. At the present time Mr. Pierce is making a short trip through the State of New York for the company, before taking up his active work in Iowa.

HENRY SHAFER, president of the International Telephone Manufacturing Company, Chicago, is making an extended trip through the Northwest to more thoroughly introduce International equipment in that section, as well as to look after his interests in connection with a movement started a little more than a year ago, to thwart the Wisconsin Bell Company in its effort to "control" all city councils in order to prevent new Independent companies starting.

B. F. WASSON, who has charge of the exhibit which will represent the evolution of the Independent telephone at the World's Fair at St. Louis, has just returned from Chicago, Elgin, and a number of other towns, and where he has secured a fine collection of telephone curios. Several shipments have lately been received, and promises have been given for many more.

MISCELLANEOUS

BOSTON, MASS.—The American Telephone & Telegraph Company instrument statement for the month ended Jan. 30:

	1904.	1903.	1902.
Gross output	90,644	129,837	87,412
Returned	36,854	43,286	34,796
Net output	53,790	86,551	52,616
Total outstanding	3,833,307	3,236,871	2,578,626

CONSTRUCTION

LE MOORE, CAL.—The Farmers' Telephone Company, of this place, will extend a line to Hanford and install several telephones in that village.

TULARE, CAL.—The People's Telephone Company, of Tulare, will construct a line from Lindsay to Porterville.

EAST ENTERPRISE, IND.—At a meeting of the Farmer's Mutual Telephone Company held here, it was decided to take immediate steps for installing exchanges at Vevay and at Rising Sun.

MERON, IND.—The Meron Telephone Company is planning to erect a new exchange building.

CEDAR FALLS, IA.—Frank Jackson, John Bancroft, L. H. Severin and others are organizing on a co-operative basis to construct a local telephone system.

ELK PORT, IA.—The Standard Telephone Company will construct a new line from here to Guttenberg.

KELLERTON, IA.—The Kellerton Mutual Telephone Company will rebuild its system.

SIGOURNEY, IA.—A meeting was held here recently of managers of mutual telephone companies of this vicinity to consider installing a local switchboard. V. W. Carris, of Keota, was chairman of the meeting. No definite action was taken but it was decided to call another meeting.

HIBBING, MINN.—The Mesaba Telephone Company will make extensive improvements in the local exchange this spring.

MONTROSE, MINN.—A stock company is being formed to build and operate a telephone line in and around Montrose.

WABASHA, MINN.—L. Trautman, Jr., has purchased the Melrose Telephone exchange.

WINONA, MINN.—The Winona Telephone Company is arranging for a 20 mile extension from here to Wiscovy. Several other extensions are in contemplation.

KNOX CITY, MO.—A new telephone line is being constructed from the farmers' exchange of this place to Colony.

LA GRANGE, MO.—The Citizens Telephone Company, of North Missouri, will construct a new line from La Grange to Ewing. The same company will probably build a line to Quincy, Ill.

DUNDÉE, N. Y.—A new telephone line from this village to Rock Stream to connect with the Reading Center and thus to Watkins is assured and will soon be constructed.

PATTERSONVILLE, N. Y.—The Pattersonville Telephone Company has been asked to construct a line to Glenville.

BUXTON, N. D.—The North Dakota Farmers' Telephone Company, with headquarters here, will construct a line from Climax to Crookston, installing a local exchange at Fisher.

EUGENE, ORE.—Residents of Lost Valley and Pleasant Hill, 12 or 15 miles east of this place, have organized to construct a line from Lost Valley connecting with Eugene.

YORK, PA.—The York Telephone Company will move its exchange into a new building, and is planning to install a new switchboard and make other improvements.

CHESTER, VA.—A move is on foot in this county, headed by P. V. Coghill, E. W. Ellison and others, to establish telephone connections with private residences in the county. The line would touch Chester, Centralia and other villages.

SPOKANE, WASH.—M. A. Phelps, president of the Interstate Telephone

Company, states that his company will begin construction from Spokane immediately on the passage of the franchise ordinance by the city council.

LANGELLS VALLEY, ORE.—Residents of Alturas and Langells Valley are arranging to construct a line from Alturas to this place, with branch lines to Bonanza, Lorella, Gerber and Bly.

SOUTH BYRON, N. Y.—The Byron Telephone Company, recently organized, is preparing to extend its lines in the early spring.

CAMBRIA, PA.—The Cambria County Telephone Company has completed a new line from Evensburg to Hastings, where an exchange will be located. The company will probably construct a line to Saint Boniface.

CARBONDALE, PA.—The Carbondale Telephone Company will move its exchange to new quarters on April 1st, and will install a new switchboard and make other improvements.

ECONOMY, PA.—The Economy Telephone Company will construct new lines to Berlin and Somerset early in the spring.

DEL RIO, TEXAS.—The Del Rio Telephone Exchange, of which C. W. O'Dell is manager, is contemplating the construction of lines to Uvalde and Carrizo.

FRANKLIN, TEXAS.—The Local Telephone Company will construct a new line from Franklin to Eaton, with about ten stations. A line will also be constructed from Franklin to Henry Prairie.

MACY, TEXAS.—There are now so many telephone lines running into Macy and Wheelock that they have decided to install a local switchboard.

CHEHELIS, WASH.—Farmers in the neighborhood of Ethel are arranging to construct a telephone line between Chehelis and Mossy Rock.

LA CROSSE, WIS.—A long-distance telephone line will be constructed from St. Paul by the Tri-State Telephone Company and the Winona Telephone Company, which will connect with the La Crosse Telephone Company's line.

ORFORDVILLE, WIS.—The Orfordville Telephone Company is planning to construct about 30 miles of wire this summer.

SUPERIOR, WIS.—At the annual meeting of the People's Telephone Company the directors decided to make extensive improvements and erect a new building, if the council will agree to a raise in telephone rates. The following officers were elected: N. M. Hubbard, of Duluth, president; William Patterson, of Superior, vice-president; Dr. R. C. Ogilvie, of Superior, secretary, and Harry Rogers, of Superior, treasurer.

RAMBLER, WYO.—The Rambler Telephone Company is planning to construct a new line to Tie Siding.

CONDUCTORS AND INSULATORS.

By E. R. Lucy.

WE all know that every substance presents a certain obstacle, as it were, to the transfer of electricity. Its transfer meets with a resistance which is widely different, according to the substance used. So small is the resistance in some substances as to be scarcely perceptible, and so great in other substances as to practically prevent the transfer at all. Practically, then, those substances which will permit an easy transfer of electricity through their mass are called conductors, and those which offer considerable resistance are called imperfect conductors, and those which offer so much resistance as to practically prevent the transfer of electricity, are termed insulators. The human body is an imperfect conductor. A metal rod or wire is a perfect conductor; glass, ebonite, resin, and paraffin are insulators.

It must be borne in mind that the division of substances into conductors and insulators is not absolute. Cully says, "There are few (if any) bodies which are perfect conductors, or which do not conduct at all under any circumstances, while even metals, the most perfect of all conductors, offer a certain resistance to the passage of electricity, or, in other words, insulate slightly. The terms used therefore imply a difference in degree only, good insulators being bad conductors, and good conductors bad insulators.

Then, again, as a "current" means, nominally, a transference of electricity, we can see that in its progress it does work; it produces motion, it generates heat, it decomposes chemical compounds, it creates magnetism, just as the substances in the table are suitable for these different performances or not. The property of matter which determines its conductivity or insulation is therefore evidently molecular, for it varies with and is dependent upon the structure of the body, especially its physical structure and condition. For instance, we see that water, when a liquid, is a conductor, when solid an insulator, while many substances when cold are insulators, when hot conductors.

Strictly speaking, an overhead wire is never perfectly insulated, even in dry weather. There is always a slight loss at every point of support, even when the insulators are dry and clean; this is, of

course, considerably increased when the surfaces of the insulators are damp. Especially is this the case when they are dusty, dirty with smoke, covered with fine salt when near the sea coast, or filled with spiders' webs, which always collect dirt and moisture. It is always noticed how much the insulation of a line is improved after heavy rain, and how bad the insulation is when only a drizzle of rain follows long dusty weather.

It is laid down as an axiom taken from both actual experience and experiment that the sea coast should be avoided when erecting electric lines as much as possible. It will be seen, then, that an insulator conducts by the film of moisture or dirt, or both, which adheres to its surface, and obeys the ordinary law of resistance; therefore the best insulation is one which has the smallest possible diameter, consonant, of course, with strength, the greatest distance between the wire and the pin or support, and which can, moreover, be maintained in the driest condition in wet weather as regards its inner surface, while exposed freely as regards its outer surface, to the cleansing action of rain, and what is very important, it must not depend for insulation on its glaze alone, but the ware must be perfectly non-conducting.

Ebonite has great claim as an insulator, but is found to become rough upon its surface after exposure to weather, and therefore very readily retains damp and dirt, and loses at once its great insulating power. At the same time it has some great advantages for special purposes.

It must at all times be remembered, especially in dealing with conductors, that a charge of electricity resides only on the surface of conducting bodies. This is proved by the fact that it is found to be immaterial to the distribution what the interior of a conductor is made of; it may be solid metal or hollow, or even consist of wood covered with tinfoil or gilt, but if the shape be the same, the charge will distribute itself precisely in the same manner over the surface. There are several ways of proving by direct experiment this very important fact, and some good results of experiments are given in Professor Thomson's book on "Electricity and Magnetism."—*The Transmitter*.

BOOK NOTICES

TELEPHONE LINES AND METHODS OF CONSTRUCTING THEM. By Walter C. Owen, Consulting Telephone Engineer, National Telephone Company, Ltd., London. Whittaker & Company, Paternoster Square, London, England, and 66 Fifth avenue, New York. 390 pages, 265 illustrations. Price, \$1.50.

This is a volume which rather graphically portrays the methods of telephone construction as viewed from the standpoint of an English telephone engineer. It is divided into two parts, the first of which deals with aerial lines, and the second with underground construction. The author commences with a brief description of the steps to be taken in obtaining rights-of-way. This is followed by a chapter upon poles, both wood and iron, and in this respect English work is considerably in advance of that in this country for foreign telephone companies use iron poles to a notable extent. Many illustrations are given showing the extensive house-top structures which are erected for the purpose of bringing into the central office great numbers of aerial wires. An account of insulators follows, succeeding which the subject of wire is taken up and discussed at length. Aerial cables receive notable attention, with special instructions for making splices.

Part second deals with underground construction, commencing with instructions for plans for cable lay-outs. Conduits are treated of and fully illustrated. The submarine cable receives attention, as well as the systems installed by simply pulling cable in the ground without protection. Distributing boxes and terminals of all descriptions are taken up in chapter nineteen. Finally, a couple of chapters on testing, in which the ordinary methods of cable measurements are given. The book contains many valuable instructions and a considerable amount of data which is interesting to the telephonist, but in many respects would be found foreign to American construction.

J. B. BAILLIERE ET FILS, 19, Rue Hautefeuille, Paris, has just issued a general catalogue comprising a brief description of about 3,000 general scientific works which are carried by this house.

The list comprises publications in medicine, industrial arts, and all of the various sciences. Each work is so listed as to show its author, number of pages, number of cuts and other details. The catalogue may be obtained gratis by applying to the publishers, and will be found valuable to those who are interested in French technical literature.

TRADE NOTES

THE ELECTRIC APPLIANCE COMPANY, Chicago, has made some very valuable improvements in its No. 36 compact type telephone, which is equipped with a five magnet generator. It has just issued a bulletin telling the whole story, which will be sent upon application.

STROMBERG-CARLSON COMPANY, Rochester, N. Y., issues a little folder showing its combination switching telephone. This is a substation instrument provided with half dozen jacks whereby it may be connected to any one of several lines, and is a great improvement over the old-fashioned plan of using knife switches for such a purpose.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, announces that the Baraboo Telephone Company, Baraboo, Wis., is making some important changes in its telephone plant at North Freedom, Wis. It is greatly enlarging the system and re-equipping the central office with an "International" self-restoring drop switchboard.

THE AMERICAN STEEL AND WIRE COMPANY has just issued a circular describing its iron telephone and telegraph wire. In this data is given showing the weight in pounds per foot and per mile, the number of bundles per mile and the various characteristics of the wire manufactured. The sheet is quite a little manual on galvanized iron wire and is well worth having.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has recently secured a contract for re-equipping the exchange of the Portage Telephone Company, Portage, Wis., with a thousand line capacity lamp signal central energy double supervisory switchboard, complete power plant, distributing board, lightning protectors and central energy telephones required for the increase.

THE ELECTRIC APPLIANCE COMPANY, Chicago, Ill., has just issued an attractive circular describing its Eaco telephone No. 36. This is a magneto wall instrument supplied with a protective device and operated by two cells of

dry battery. The circular illustrates it thoroughly, showing the arrangement of the magneto and other parts. Reference is also made to the toll or party line switchboard which is offered by this company.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, announces the following recent switchboard shipments: Monclova Coah, Mex., one 200 line Express; Ann Arbor, Mich., one 100 line Express; Richmond, Mo., one 50 line Express; Rockville Center, L. I., one 25 line Express; Elk City, Okla., one 200 line Express; Lebo, Kan., one 100 line Express. In addition to the above, increases have been made in old established exchanges. Brazil, Ind., with an increase of 150 lines, being the last one shipped.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, of Chicago, Ill., has added another unique and practical feature to its telephone in the way of a bell damper. This is a mechanical device operated by the switchhook in such a manner as to throw a leather damper on the inside of each gong when the receiver is removed and the hook goes up. All telephone patrons as well as exchange managers will appreciate this invention, as it eliminates the annoyance of a prolonged vibration of the gong. Hereafter all Monarch telephones will be equipped with this device.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY has just issued an artistic folder descriptive of the various forms of lead-covered cable which it is now prepared to offer. The circular is brief, and apparently designed more as a notice of the ability of this company to furnish telephone cables than to give definite information. Presumably, the intention is to whet the information appetite of the exchange manager and engineer, and cause them to write to Rochester for fuller details. The folder may be had for the asking, and is well worth it.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—Having changed to a Central Energy board, we will sell our magneto telephones, good as new, cheap. ORANGE COUNTY TELEPHONE CO., Middletown, N. Y.

143

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$ AVE A DOLLAR OR \$0. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich.

131

SALESMEN WANTED.—Reliable men to carry as a side line, an up-to-date line of Advertising Fans, sold to Furniture, Hardware, Drug, Shoe and General Merchants. Convenient to carry. Prompt remittances. GEO. H. JUNG & CO., Cincinnati, O.

139

POSITION WANTED.—By a man with nine years' experience. Good on switchboard instruments or line installations and repairs. Can give excellent references. Address Box 142, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

142

WANTED—TELEPHONE MAN.—Must possess thorough technical knowledge of the business and be experienced in construction and operation. Address W. M. HUBBARD, President of The Zenith City Telephone Company, Duluth, Minn.

144

POSITION WANTED.—By a man with seven years' experience as a wire chief in a large Western city with a modern plant. He is familiar with all branches of the business. Address Box 135, care of AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

135

WANTED.—City Foreman, competent to oversee trouble and light construction system, 2,000 subscribers, Central Energy. Address Box 145, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City.

145

A sample carload of our Poles will convince you, where pages of talk might not. A word from you will bring our prices to clinch matters.

May we not hear from you?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. **ESCANABA MICHIGAN**

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

Juniper Poles

The Standard Pole & Tie Co.

550 Venezuela Building, New York

The **Valentine-Clark Co.**

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Idaho Cedar Poles

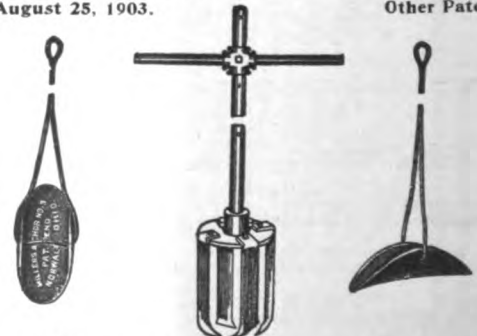
PACIFIC COAST POLE CO.

SPOKANE, WASH.

"THEY NEVER PULL UP"

Patented August 25, 1903.

Other Patents Pending



Write for Description and Prices.
THE MILLER ANCHOR CO., Norwalk, Ohio

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

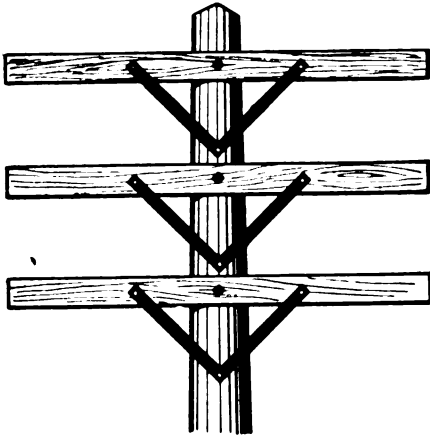
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN :: JAPANNED :: GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

::

::

::

::

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMONIE, WIS.

Cedar Poles

Large Stock

Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO.- MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "casing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

SPECIAL CROSS ARMS ALL HEART Long Leaf Yellow Pine

We can furnish any quantity promptly. Output 500,000 ft. per month.
Prices low—quality the best. Write us for delivered prices.

Lewis Lumber & Mfg. Co., R. R. Akers, Mgr.
HATTIESBURG, MISS.

Tell the Advertiser you saw his announcement in

The American Telephone Journal.

E. OHURCHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

The Morse
Cedar
Co.

CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.

Saginaw,
Mich.

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Linemen's Outfits
Construction Tools



Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

We Make
a Specialty
of
Telephone
Poles.

Large Stock
18 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

FRANCIS BEIDLER & CO.
459-519 W 22d St.
CHICAGO, ILL.


Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♡ ♡ ♡

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.
167 Dearborn St.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR** " " "
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

A Great Educator

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

**The American
Telephone Journal**

**116 Nassau Street,
New York City.**

THE FAHNESTOCK TRANSMITTER COMPANY
Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. * * * *
74 CORTLANDT STREET, NEW YORK CITY

Chicago Insulated Wire Co
Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL, \$250,000.00.
Main Offices, 551-2-3 The Spitzer, **TOLEDO, OHIO.**
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,
**ENGINEERS
CONTRACTORS**
Telephone Engineering and Construction
... Plans, Specifications and Estimates Promptly Furnished ...
Meritorious Independent Telephone Enterprises Financed.
1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE

DIRECT READING
Voltsmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of energy.

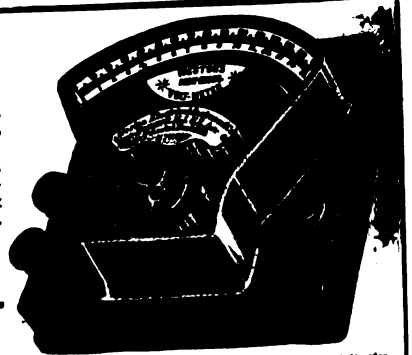
Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

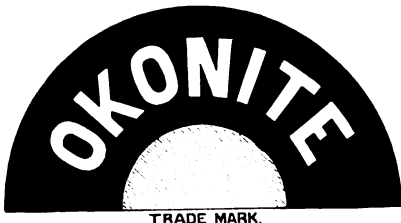
PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

COOK PROTECTORS

STANDARD



Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS.—Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO



**Large Factories in East and West.
Moderate Prices. Prompt Deliveries.**

Tell us your requirements and we will submit samples and prices.

**C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.**

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, **and at much less cost.**

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarred by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY
Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S
(Patent)

**CONNECTORS
AND
TERMINALS**

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

ADVERTISERS' DIRECTORY-Continued.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingway Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Lealie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.

Churchill, E., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.

Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

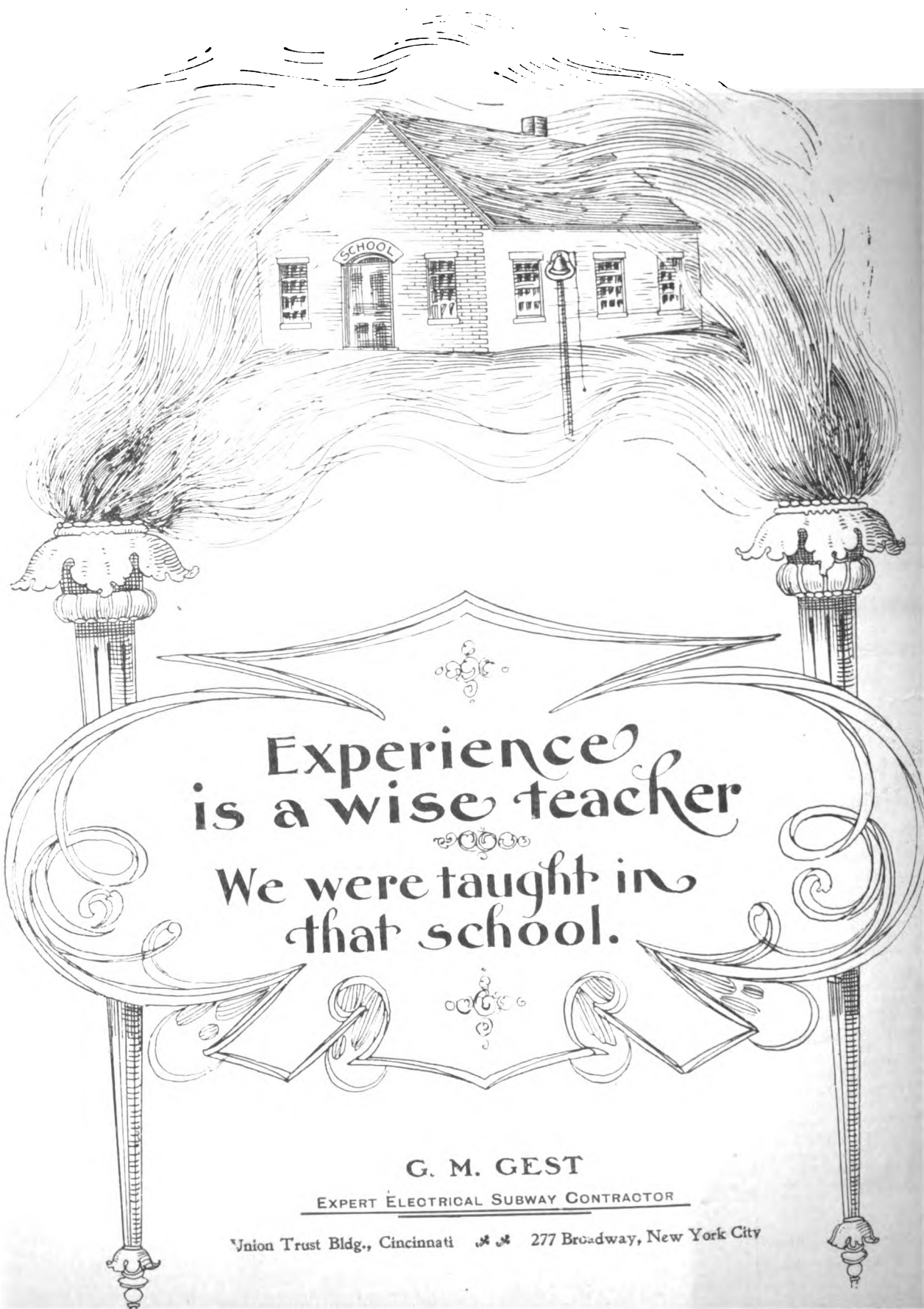
170 Broadway, New York, N. Y.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the **WESTERN ELECTRIC COMPANY.**

ADVERTISERS' DIRECTORY—Concluded

- | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sand Point Cedar Co., Sand Point, Idaho.
Standard Pole & Tie Co., N. Y.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.</p> <p>POWER PLANTS.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> <p>PROTECTORS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.</p> <p>SEALS.
Middleton & Co., J. W., Chicago, Ill.</p> <p>SIGNS.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.</p> <p>SOLDER, RESIN CORE.
Kellogg Switchboard & Supply Co., Chicago, Ill.</p> <p>STATIONERY.
Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.</p> <p>STEEL.
Leslie A. C., & Co., Montreal, Can.</p> <p>STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.</p> | <p>SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.</p> | <p>Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.</p> <p>TELEPHONE BOOTHS.
Yesbera Manufacturing Co., Toledo, Ohio.</p> <p>TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.</p> <p>TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.</p> | <p>International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co. Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.</p> <p>TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C. Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.</p> <p>TOLL TICKETS.
Gildart Bros., Albion, Mich.</p> <p>TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.</p> <p>WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Seovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co., Pittsburgh, Pa.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Experience
is a wise teacher

We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of
Philadelphia how they like our conduit. They
should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

American Independents Guaranteed

BY THE USE OF OUR APPARATUS

CENTRAL ENERGY

Do you know that in our central energy system you have no relay contacts to talk through? We use the impedance coil system, which gives the best talking results. It is the most reliable for party line work, and this is of the greatest importance at the present time.

MAGNETO

Our self-restoring drop boards and our telephones are the recognized standards which others try to emulate and obtain.

4 Leich Four-Party Selective System

The only practical system using condensers in the bell circuits. Has no springs to adjust or relays to get out of order.

Send for our Selective Bulletin B6

**AMERICAN ELECTRIC
TELEPHONE COMPANY**

36-58 W. JACKSON BOULEVARD, CHICAGO

THE AMERICAN TELEPHONE JOURNAL

To Every Sale—

there are four parts: Attention,
Interest, Desire and Conviction.

A good ad in a good medium will
arouse attention and interest, bring
desire and force conviction.

The American Telephone Journal is
such a medium and the best in its
chosen field.

Advertisers say so—

"This paper, it is conceded, is
the leading telephone journal.
We have been among its patrons
for years, and have received the
very best results. The paper is a
fearless defender of Independent
telephone interests, and is an im-
portant factor in the field.

"AMERICAN ELECTRIC TELEPHONE CO.
Telephones and Switchboards,
Chicago, Ill."

The reason is that the American
Telephone Journal has been built on
the right basis.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MARCH 12, 1904—CHICAGO Number 11

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

BRIDGED MULTIPLE TROUBLES, THEIR LOCATIONS AND REMEDIES.....By A. O. Stigberg
TRANSPPOSITION OF TELEGRAPH LINES: CROSS TALK AND INDUCTION. Article III.....By Frank F. Fowle
SELECTIVE KEY FOR EXTENSION SETS. By F. R. Pine UNITED STATES TELEPHONE ANNUAL MEETING
INDIANAPOLIS INDEPENDENT COMPANY REORGANIZED TELEPHONE TRAGEDIES

The Operating Field:

CUYAHOGA'S NEW RATE SCHEDULE
A GOOD SUGGESTION
AUBURN COMPANY'S NEW BUILDING
ATTORNEY INSTALLS INDEPENDENT BRANCH EXCHANGE ON HIS OWN WIRES
TELEPHONE SYSTEM WILL SAVE C., M. & ST. PAUL RAILROAD MONEY
ALLEGED INFRINGEMENT OF PAY STATION SIGNAL DEVICE
HANDLING A TELEPHONE BUSINESS
ABOUT CLASSIFIED TELEPHONE DIRECTORIES
CANTON, N. Y., MUTUAL TELEPHONES
CROSSED WITH HIS WATER PIPE
GERMAN TELEPHONE OPERATORS
CUMBERLAND TRIES TO ENTER CAMDEN, TENN.
QUERIES.
THE WEEK'S MESSAGES.
WANT AND FOR SALE ADVERTISEMENTS, PAGE 176.
THE EDITOR'S PAGE.
TRADE NOTES.
PATENTS.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or Special Articles of Brass, Copper, German Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

The demand for Interior Telephones is limited only by the lack of proper promotion. Private dwellings, offices, stores, hotels, warehouses, etc., want and must have them—the times demand them.

The Dinsmore Automatic Telephones are in a particular class of their own—a satisfactory class, which combines ready action, positive in operation and simple in the extreme.

Automatic, the replacing of the hook restoring connection and ready for another operation. To ring, obtain proper connection, lift the receiver from the hook, and push the button with the proper number all the way in, which, while held full in, rings the party wanted and at the same time gives talking connection. Can also be operated for 3-party or more conversation by pressing as many buttons as desired.

No plugs, no ropes or weights. No hesitation in service, immediate thorough connection, and both ringing and talking connection made with one operation. Made in several styles. Handsome in appearance. Prices upon application.

Also made for Desk Set style telephones, which are semi-automatic.

ELECTRIC APPLIANCE COMPANY
CHICAGO

**Insulated
Electrical
Wires and Cables**



**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.
TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

Agencies and Branches
**CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

SUBSCRIPTION BLANK

Out this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

.....1904
American Telephone Journal
116 Nassau St., NEW YORK

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

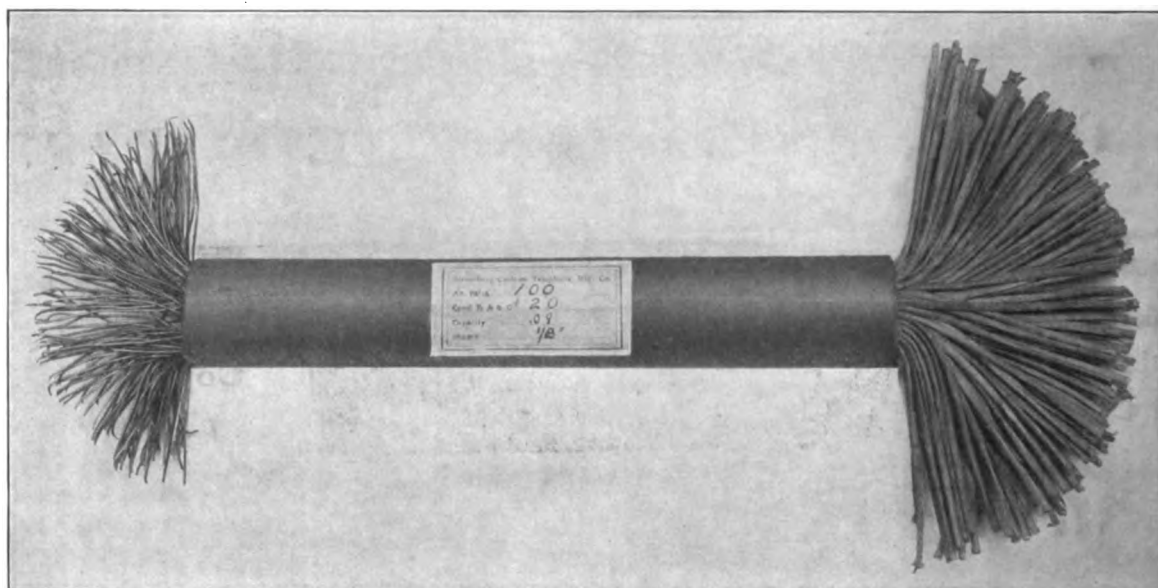
Name.....

P. O. Address.....

STROMBERG - CARLSON

DRY CORE L E A D COVERED CABLE

**Special Sizes and Capacity to Meet the
Requirements of the Purchaser.**



Superior Qualities, High Grade Material,
Superior Forming, Prompt Delivery. Ⓟ
Prices the Lowest, Quality Considered.

Stromberg-Carlson Tel. Mfg. Co.

Gen'l & Eastern Sales Office,
ROCHESTER, N. Y.

Sales Dept.,
CHICAGO, ILL.

THE CENTURY COMBINATION SWITCHBOARD

Capacity for 100 Target Sig-
nals for Common Battery—
12 Signals for Toll and Rural
Lines :: :: :: :: ::

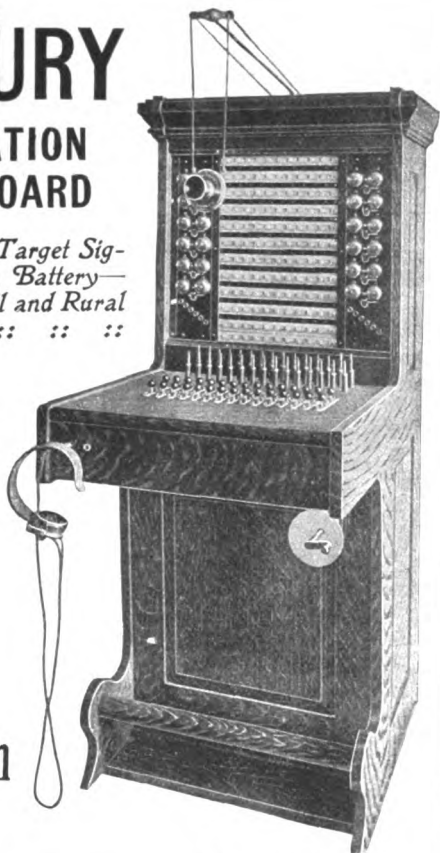
Common Bat-
tery from 100
LINES up to
10,000 LINES
Capacity

MAGNETO BOARDS
ALL CAPACITIES

Century
Telephone
Construction
Company

536 Ellicott Square,

BUFFALO, N. Y.



"The memory of quality
lasts long after price has
been forgotten."



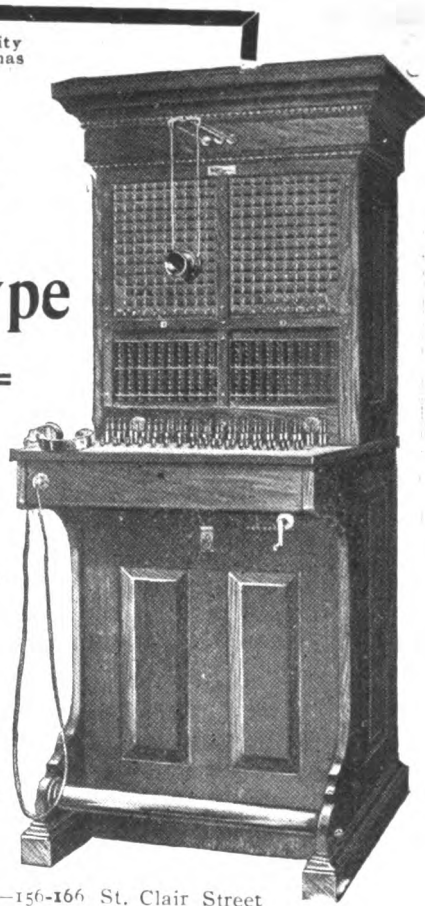
Unit Type Switch- boards

They Grow
As You Need Them

Write for Catalog

THE
NORTH
ELECTRIC
COMPANY

Cleveland, O., U. S. A.—156-166 St. Clair Street



Upstairs or Down!

What an unusual possibility,
speaking of telephones!

In most residences, however,
this wonderful adaptability may
be realized by the use of

THE PENDENT TELEPHONE

Simply a matter of length of
cord, and the adjoined receiver
and transmitter will always hang
ready at hand, at any height,
perfectly counterbalanced.

Never in the way and never
far away.

Invaluable as well at the desk,
counter or bench.

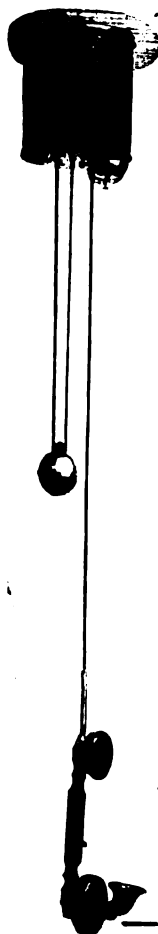
Movable to and adjustable at
any lateral point.

Handsome, efficient, durable
and inexpensive.

The Vought-Berger Co.,

Makers of First-award Telephones,
Switchboards and Appliances.

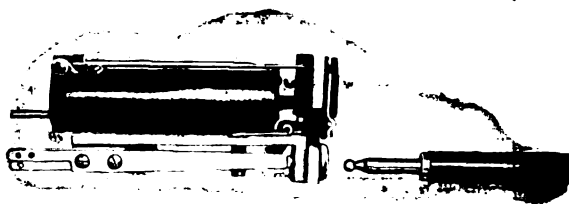
LA CROSSE, WIS.



INTERNATIONAL Telephone Mfg. Co.

Mechanical Self Restoring Drop SWITCH BOARD

A PERFECT APPARATUS



MADE IN ANY DESIRED CAPACITY.

For rapidity of operation, simplicity
and durability of parts, perfection of
mechanical detail and neatness of
design it has no equal

WRITE FOR BULLETIN "A."

International Telephone
Manufacturing Co.

CHICAGO, ILL.



SPRING IS HERE



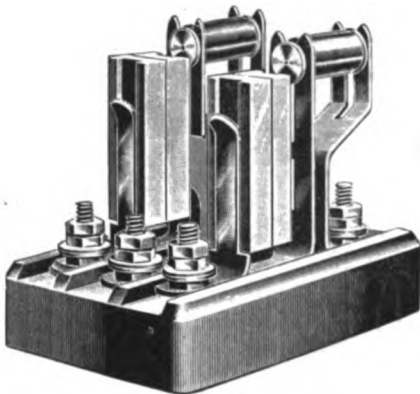
WITH ITS

STORMS

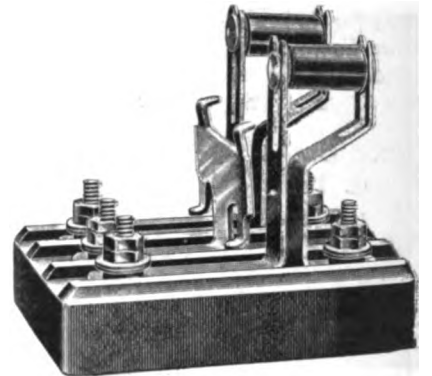
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 261 A.



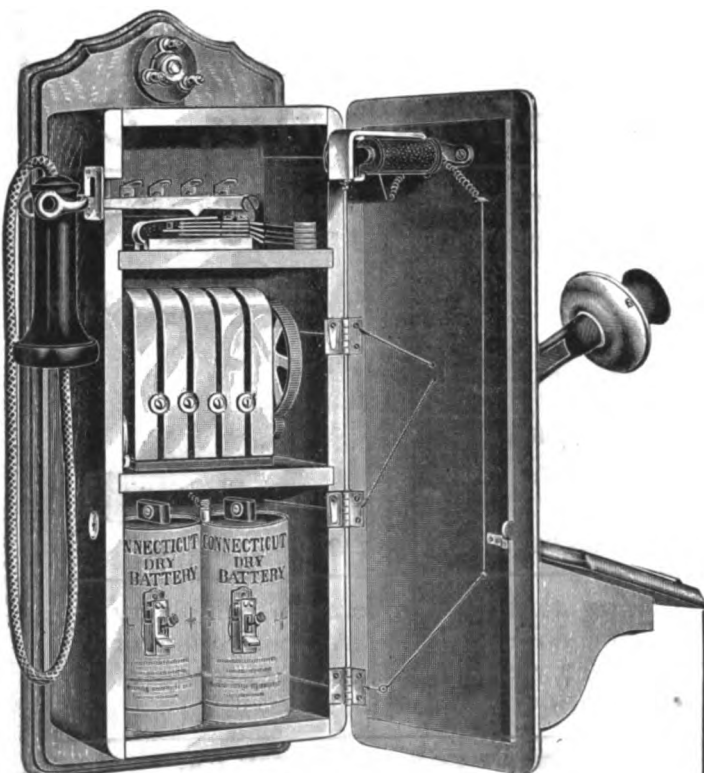
Something New in a Protector for Telephones.
Order No. 261 B.

WRITE FOR PRICES.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



Strongest and best Telephone on earth
The special quantity price will interest you
**CONNECTICUT TELEPHONE
AND ELECTRIC CO.**
MERIDEN, CONN., U. S. A.

47 Systems for Business Men



THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan

The High Character of Kellogg Apparatus

AND THE

Absolute Reliability of the House

**Are making our business
outgrow our buildings,
as a healthy boy
outgrows his clothes.**

**KELLOGG SWITCHBOARD AND
SUPPLY COMPANY**   

Green and Congress Streets, Chicago

**ELECTRIC BUILDING, CLEVELAND.
KEYSTONE TELEPHONE BUILDING, PHILADELPHIA.**

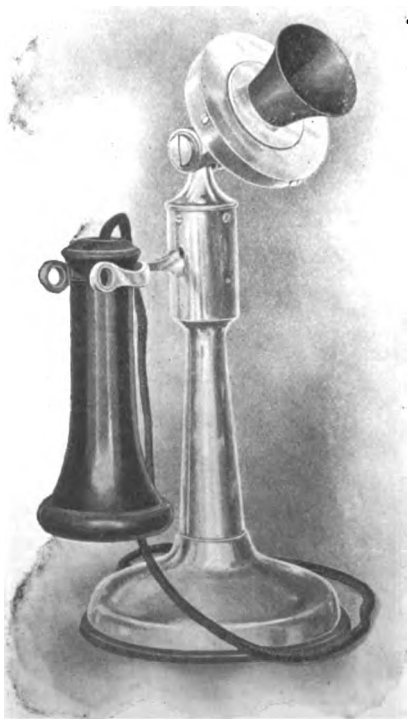


MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.
14th So. Clinton Street
CHICAGO, ILL.

The Perfect Desk Set



Perfect Transmission

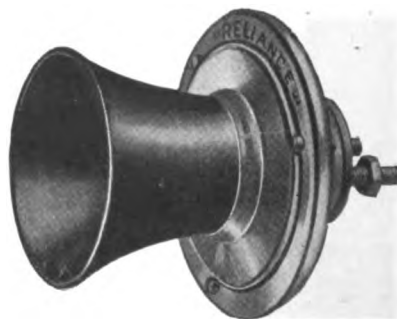
- " Receiving
- " Switch Con-
tacts
- " Soldered
Connections
- " Nickeling
- " Strength

A Perfect Beauty
for Local or
Common Battery

ADOPT IT
and cut your
maintenance half

The Eastern Telephone Mfg. Co.
West Chester, Pa.

Reliance Transmitter No. 90



For mounting on woodwork
or adjustable arms

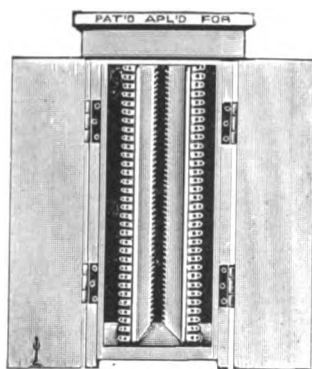


The Button
(actual size)

ORDER ONE TO-DAY
SAMPLE PREPAID

75 Cents.

S. H. COUCH CO.
162 PEARL ST. BOSTON, MASS.



READY POLE HOUSES

Made in any size up to 200 pair with or without fuses

WRITE FOR PRICES

Telephone Cable, Ready Reels, Construction Tools and Material

SEND FOR OUR ESTIMATE SHEET

The W. G. Nagel Electric Co.
TOLEDO, O.

ADVERTISERS' DIRECTORY

American Conduit Co.	37	Dickey Clay Mfg. Co., W. S.	36	Klein, Mathias, & Sons	33	Koebling's, John A., Sons Co.	3
American Electric Telph. Co.	40	Eastern Telephone Mfg. Co.	8	Leslie, A. C., & Co.	12	Sand Point Cedar Co.	30
Am. School of Correspondence	—	Electric Appliance Co.	3	Lewis Lumber & Mfg. Co.	33	Scovill Mfg. Co.	2
American Vittrified Conduit Co.	39	Elkin Machine Co.	33	Lindsley Brothers Co.	32	Shaw-Walker Co.	6
Automatic Electric Co.	9	Ericsson Telephone Co.	10	McIntire, C. Co.	36	Spargo, James A., Wire Co.	34
Barr, W. J., Mfg. Co.	12	Fahnestock Transmitter Co.	34	Maltby Lumber Co.	29	Standard Pole & Tie Co.	32
Beidler, Francis & Co.	33	Field, C. J.	36	Michigan Cedar Co.	33	Standard Underground Cable Co.	12
Bissell Co., The F.	11	Fowler, John H.	32	Middleton, J. W., & Co.	34	Stanton, L. W.	34
Butterfield, J. F.	34	Franklin Rolling Mill & Fdy. Co.	31	Miller Anchor Co.	—	Sterling, W. C., & Son.	33
Camp, The H. B. Co.	39	Gest, G. M.	38	Monarch Telephone Mfg. Co.	8	Sterling Electric Co.	6
Central Mfg. Co.	30	Hemingray Glass Co.	11	Morse Cedar Co.	33	Stromberg-Carlson Telephone Mfg. Co.	4
Central Telephone & Electric Co.	—	Holtzer-Cabot Electric Co.	—	Nagel, W. G., Electric Co.	9	Swedish-American Tel. Co.	12
Century Telephone Const. Co.	5	Huebel, C. J., & Co.	29	National Wire Corporation.	35	Telephone Printing Co.	33
Chicago Insulated Wire Co.	—	Hyde, W. H., & Co.	34	New Haven Novelty Machine Co.	2	Valentine Clark Co.	30
Chicago Writing Machine Co.	—	Imperial Finance & Cons. Co.	34	North Electric Co.	5	Vought-Berger Co.	5
Churchill, E.	33	Ingram-Richardson Mfg. Co.	12	Nungesser Electric Battery Co.	10	Wanted, Situations, etc.	176
Cohn & Bock	33	Index of the Technical Press	30	Okonite Company	34	Weston Electrical Instrument Co.	34
Columbia Electric Co.	—	Inland Steel Co.	32	Pacific Coast Pole Co.	30	Wisconsin Timber & Land Co.	33
Connecticut Telph. & Electric Co.	6	International Telephone Mfg. Co.	5	Pignolet, L. M.	11	Worcester, C. H., Co.	29
Cook, Frank B.	—	Kellogg Switchboard & Supply Co.	7	Pittsburg & Lake Superior Iron Co.	29	Yesbera Mfg. Co.	—
Couch, H. Co.	8			Pittsburg Sewer Pipe & Conduit Co.	36		
Crumb, W. H., Co.	34						
Cunningham Iron Co.	36						
BATTERIES.							
Clark, James, Jr., & Co., Louisville, Ky.		Bissell Co., The F., Toledo, O.		CABLE SLEEVES.		Cunningham Iron Co., Boston, Mass.	
Electric Appliance Co., Chicago, Ill.		Chicago Insulated Wire Co., Chicago, Ill.		Nagel, W. G., Electric Co., Toledo, O.		Field, C. J., New York.	
Nungesser Electric Battery Co., Cleveland, O.		Kellogg Switchboard & Supply Co., Chicago, Ill.		New Haven Novelty Machine Co., New Haven, Conn.		Gest, G. M., Cincinnati, O.	
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.		Nagel, W. G., Electric Co., Toledo, O.		CARD INDEX SYSTEMS.		Nagel, W. G., Electric Co., Toledo, O.	
BONDS.							
J. W. Middleton & Co., Chicago, Ill.		National Wire Corporation, New Haven, Conn.		Shaw-Walker Co., Muskegon, Mich.		Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.	
BRASS.							
Scovill Mfg. Co., Chicago, Ill.		Okonite Co., New York.		CLIMBERS.		W. S. Dickey Clay Mfg. Co., Kansas City, Mo.	
BOOTHES.							
Yesbera Mfg. Co., Toledo, O.		Roebling's Sons Co., John A., Trenton, N. J.		Klein & Sons, Mathias, Chicago, Ill.		CONNECTORS.	
CABLES.							
American Electric Tel. Co., Chicago, Ill.		Standard Underground Cable Co., Pittsburgh, Pa.		Nagel, W. G., Electric Co., Toledo, O.		Cook, Frank B., Chicago, Ill.	
		Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.		CONDUITS.		McIntire Co., C. Newark, N. J.	
						American Conduit Co., Chicago, Ill.		Nagel, W. G., Electric Co., Toledo, O.
				American Vittrified Conduit Co., New York.		CONSTRUCTION SUPPLIES.	
				Camp Co., The H. B. New York.		American Electric Tel. Co., Chicago, Ill.	
						Electric Appliance Co., Chicago, Ill.	

WANT AND FOR SALE ADVERTISEMENTS. PAGE 176.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

Will you take the People's Word?

Subscribers in the following cities will tell you that Automatic telephone service is the best:

Chicago, Ill. Grand Rapids, Mich. Portland, Me. Fall River, Mass. Dayton, O.
Augusta, Ga. Albuquerque, N. M. Columbus, Ga. Cleburne, Tex. New Bedford, Mass.
St. Mary's, O. Medford, Wis. Manchester, Ia. Princeton, N. J. and many others.

Automatic Electric Company, Chicago, U. S. A.

WE GUARANTEE

Quality, Durability

Low Cost
Maintenance

and
Absolute
Perfection

of the
working parts
of all of our
instruments

Send for our Catalogue
for full information

ERICSSON TELEPHONE COMPANY

"INDEPENDENT"

Manufacturers and Importers of Switchboards, Telephones
and Telephone Supplies for Magneto and Common Battery

296 BROADWAY, NEW YORK



ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Leslie, A. C., & Co., Montreal,
Can.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago,
Ill.

CORRESPONDENCE SCHOOL.

American School of Correspon-
dence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Townsend Cedar & Supply Co.,
Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon,
Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

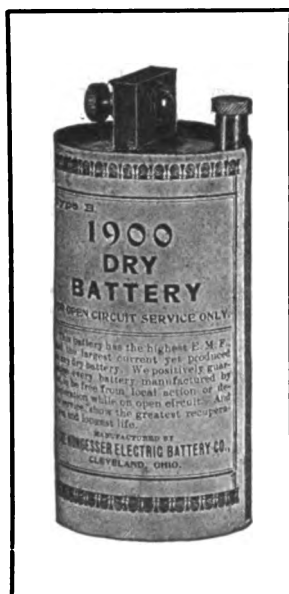
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., To-
ledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.

CONTINUED ON PAGE 36.

THE "1900" DRY BATTERY



Adopted by many of the largest Contract-
ing and Operating Companies.

Standard size two and one-half inches in
diameter, six inches high, made especially
for telephone use, but is adapted to all kinds
of bell work.

SPECIFY THE

"1900"

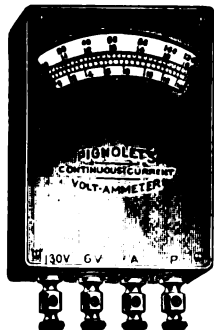
The Manufacturers Stand Behind the Quality of the Goods

THE MUNGESESSER ELECTRIC BATTERY CO.

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.



It is always a multiple of 100 ohms.

Easy, isn't it?

Write us we will tell you more.

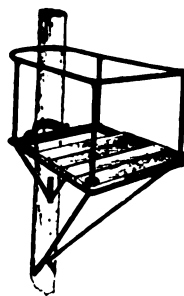
They don't cost very much.



LOUIS M. PIGNOLET

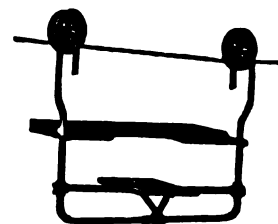
Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City



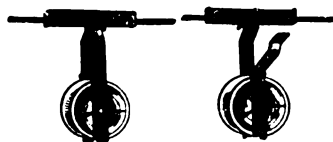
POLE PLATFORMS

With Railing - - - \$7.25
Without Railing - - - 4.25



CABLE CARS

Without Table - - - \$7.50
Table, extra - - - 2.50



CABLE TROLLEYS

Each - - - - - \$1.50

BULLET IN 233

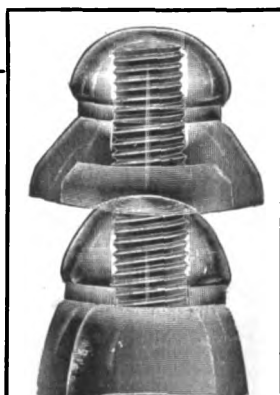
Showing Telephone Goods

Sent prepaid on request

THE F. BISSELL COMPANY
TOLEDO, O.

THE STANDARD "HEMINGRAY"

ALL WITH THE "PATENT DRIP PETTICOATS."



Two-Piece Transposition

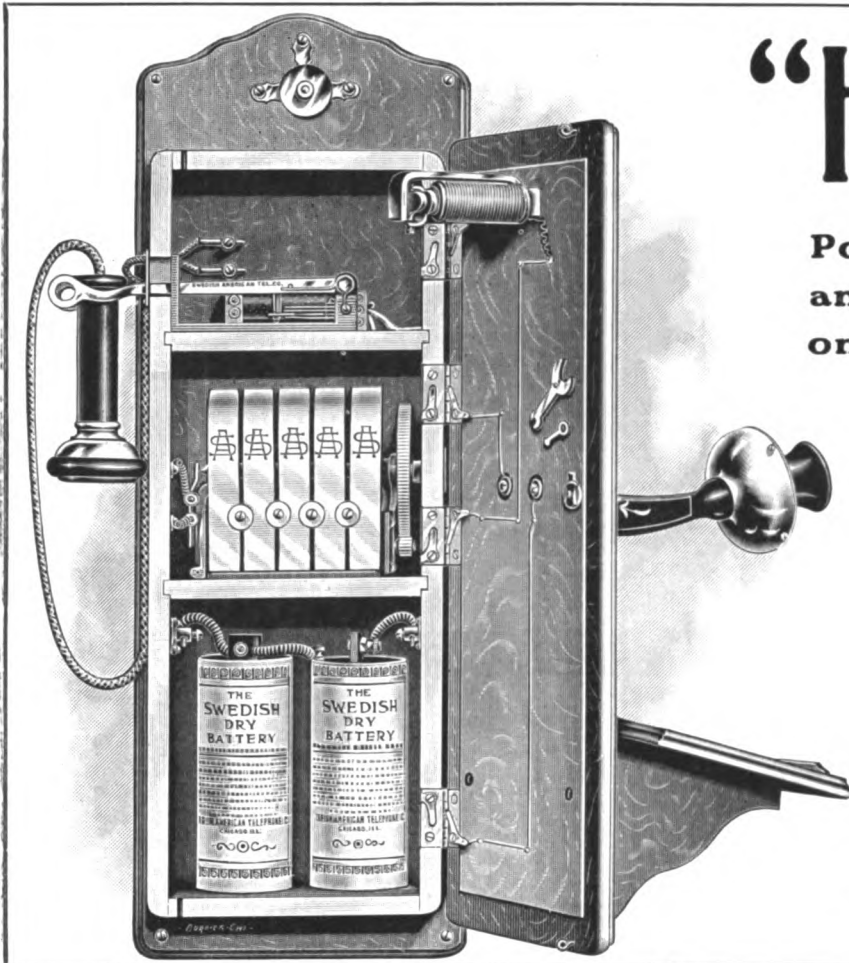


THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

Factory, Muncie, Ind.

ESTABLISHED 1848.



"Hercules"

Positively the strongest
and most durable bridge
on the market.

100,000

IN DAILY USE

BECAUSE

*They are superior to others.
Give better service.
Cost less to maintain.
Ask us for catalogues and
prices.*

Swedish-American Tel. Co.
CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



A Stranger in A Strange Town

When he wants to telephone,
immediately "rubbers" for a
TELEPHONE SIGN.

He can see our enameled iron signs a block away,
and it gets his money. A liberal use of signs is a
profitable investment for any exchange.

LET US QUOTE YOU PRICES

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

MAGNET STEEL

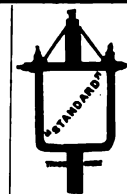
Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 163 Randolph St., Chicago, Ill.

Telephone
Wire



and
Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables Aerial—Underground—Submarine
Lead Covered Cables
TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,
PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MARCH 12, 1904

NUMBER 11

BRIDGED MULTIPLE TROUBLES. THEIR LOCATION AND REMEDIES

By A. O. STIGBERG.

THE most common and frequent cases of trouble, peculiar to a bridged multiple, are as follows: A permanent signal on some particular line; this is usually caused by a short circuit on the line itself, i. e., the tip and sleeve being crossed, or the sleeve wire of this particular line being crossed with the first, or third (tip and test wire) of some adjoining line. Subscriber complains that he cannot get central office at times. If this trouble is not caused by a loose connection on the line, the chances are that it is caused by the third wire, or test, of this particular line being

line relay, or intermediate distributing board. Cannot answer subscriber in the answering jack, but O. K. in the multiple. Open jumper on the intermediate distributing frame or a loose connection at this place, or possibly, a loose connection at, or defective adjustment of the answering jack. Operating department complains of a loud "buzzing" noise on some particular line. Look for a cross between the sleeve and test wire of same.

Above is a brief description of the most prevalent troubles and their probable causes. Below we will give detailed explanations

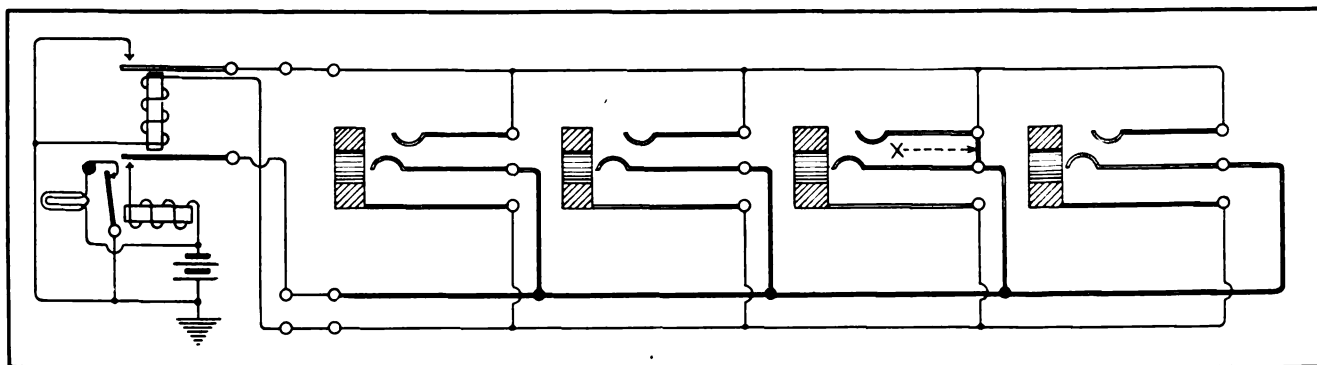


Figure 1.

crossed with the sleeve wire of some adjacent line. This will hold good if the subscriber does not complain of cut-offs during connections as this will indicate that there are no loose connections in the talking wires and that the trouble comes in from the described cause.

Subscriber complains that he is often called and hears other people on the line. Assuming that this trouble is in the exchange the most likely place for it to exist is between the sleeve wire of this line and the sleeve wire of some adjoining line. Operating department complains of line testing busy, with no connection upon same; the third, or test wire, of this particular line is crossed with the same wire of some adjoining line. Operating department complains that the signal does not disappear after plugging in to answer a subscriber. This can be caused by an open

of the best method to employ in locating and clearing same. The general description of tests employed very extensively in large multiple exchanges throughout the country, consist of the simple arrangement of listening, or plugging in on the line in trouble with the ordinary head telephone, or receiver of any type, connecting same to the tip, sleeve, or test, of the plug in order to meet the peculiar conditions for which we are testing. See Fig. 4, R₁, R₂ and R₃.

Thus, referring to Fig. 1, it will be noticed that we have indicated a cross between the tip and sleeve at the third jack of this figure. The results of this, as will be readily seen from the circuit, will be a permanent signal at the answering position. To locate the exact jack in which this cross exists, take a receiver and having same connected to the tip and sleeve of an ordinary

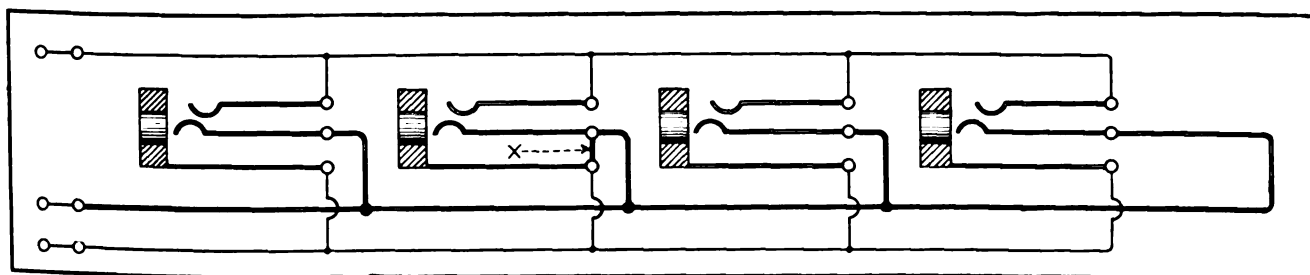


Figure 2.

of the test conductor of the cord circuit, or an open winding in the cut-off relay, or a cross between the third wire of this line and the tip wire of some adjoining line. Operating department complains of getting line pilot lamp, but no line signal. Look for defective lamp in the position thus affected, or a loose connection at the

plug, and plug into the first jack on the switchboard, noting the volume of click in the receiver at this point. If it is found to be quite audible, it will indicate that the trouble is still farther on, and it will be found necessary to move on to the next section, again making the same test. When close to the jack that is in trouble,

the click will diminish in proportion to the resistance remaining in the circuit, and when plugging in at the jack, where the trouble is in existence, the click will in most cases, not be audible, this depending on the resistance of the cross. The trouble itself may be due to some foreign article, such as the point of a lead pencil, the metal tip of a plug, or some other metallic substance. It may also be caused by the springs on the back of the spring jacks being in contact.

Referring to Fig. 2, it will be noticed that we have indicated the cross as existing between the sleeve and test of this particular line. The results of this cross will be a rather violent vibration on the cut-off relay, causing quite a "hum," or "buzzing" on the line in question. This, you will notice (see circuit Fig. 1), is

tion, however, are party lines, the trouble will become evident at once, as both telephones will be rung while either one is being called. Referring to this same line 4 as crossed with line X-2 (Fig. 5), it will be seen that the two sleeve wires of these lines are in trouble. This will soon be in evidence from the fact that either subscriber calling, will cause both line lamps to appear, or either subscriber being rung, will cause both bells to ring. This from the fact that all lines, under normal conditions, are common to the ground battery, and if the other side of two respective lines are crossed, it will naturally put same in a bridge.

Line 4, crossed as indicated by X-3 (Fig. 5), brings in some very disagreeable features, i. e., a connection up on either line will hold the cut-off relay open on the line crossed with, in this

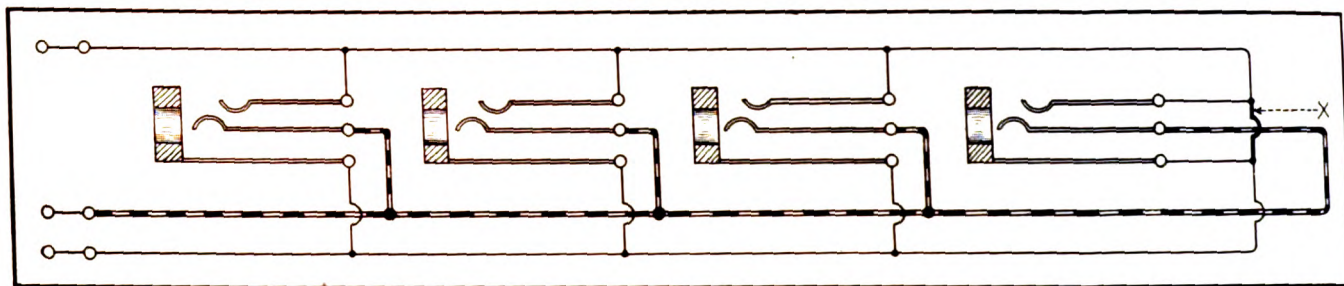


Figure 3.

due to the condition of the circuit, we getting a ground through the winding of the cut-off relay to the test wire of the line, this being crossed with the sleeve wire of the same line, which gets battery through the break contact of the relay, this then assumes the condition of an ordinary buzzer, or circuit-breaker; hence, the noise on the line. To locate the trouble connect up the receiver to the test and sleeve of the plug, and proceed with the test as described for Fig. 1.

Referring to Fig. 3, it will be noticed that we have indicated the cross on the line in question, between the tip and test wires of same. The result of this trouble will be the inability to plug out the line signal when answering a subscriber, this being due to the fact that the battery, supplied over the test conductor of the cord, instead of flowing through the winding of the cut-off relay to ground, flows from the test side of the line over the cross to the tip conductor of the line and to ground direct. To locate this trouble connect the receiver to the tip and test conductors of the plug and proceed in the manner described for Fig. 1. The above troubles have been peculiar in being confined to conductors of one

way making it impossible for the subscriber on this line to call the exchange, his line being open at the contacts of the cut-off relay. It also throws a false "busy test" on the line crossed with, causing the subscriber on this line to lose many calls, as the operators, testing the line, will receive a "busy test," although no connection is up on same. The cross, as shown between jack 4-A and X-4 (Fig. 6), will not become evident on line 4-A unless it is a party line, in which case it will be rung when ringing on line X-4. The trouble, however, will become evident at X-4 in making the line lamp appear on this line, caused from the ground battery on the tip wire of line 4-A (See circuit)..

The cross, as shown between line 4-A and X-5 (Fig. 6) will cause a permanent signal on the answering jack of 4-A, and will further throw a false "busy test" on line X-5, as well as keeping this line open to the subscriber, he not being able to signal central office while this trouble is in existence. The cross, as shown between line 4-A and X-6 (Fig. 6), brings in the difficulty at 4-A of not being able to plug out the lamp signal. The reasons for this will be readily seen by referring to the circuit on Fig. 1. The battery, which should flow through the winding of the cut-off relay on line 4-A, flows directly to ground at line X-6.

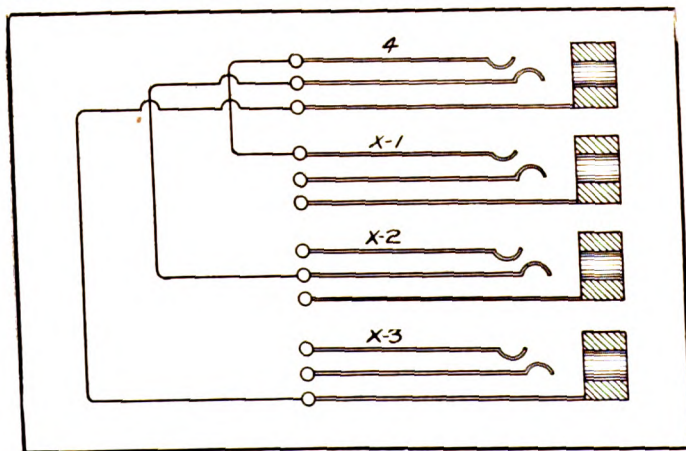


Figure 5.

line, all having taken place between some two conductors of same. Below, we will describe the peculiarities of the same line when crossed with some parts of adjoining lines. The lines we are testing are numbered 4, 4-A and 4-B. The lines, that same are crossed with, have been indicated as X-1 to X-9, inclusive.

Referring to (Fig. 5) line 4, crossed as indicated by line X-1, it will be seen that the tip of this line is crossed with the tip of line X-1. Trouble of this nature is very likely to be in existence for some time before being discovered, as, under ordinary conditions on a strictly metallic line, it will only be in evidence when the two lines are used at the same moment. If the lines in ques-

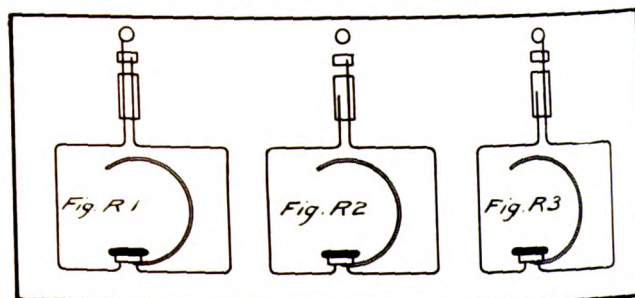


Figure 4.

The trouble existing between jack 4-B and X-7 (Fig. 7), will be just the reverse of that at 4-A and X-6: in other words, not resulting in any particular annoyance on 4-B, unless this is a party line, in which case the ringing current, which should go out on this side of the line, will be shunted to earth by the winding of the cut-off relay on line X-7. This cross, however, will also have the effect of making it impossible to plug out the lamp signal at X-7, as previously described between 4-A and X-6.

The trouble existing between line 4-B and line X-8 (Fig. 7) will be a case of permanent signal at line 4-B. Trouble existing between line 4-B and X-9 (Fig. 7) will result in a false "busy test" at line 4-B, when a connection is up on line X-9, also holding the cut-off relay open, making it impossible for the subscriber on this line to signal the central office. The method of determining

which particular line, the line in trouble is crossed with, would be to connect a receiver to that part of this line which, from the foregoing explanations, is most likely to bring the trouble about, i. e., testing to locate a permanent signal, it is evident that the sleeve wire is crossed with some part of some other line, which will bring in the ground side of the battery. This will be the first, or third (tip, or test) wire of the unknown line. While listening on the sleeve wire, as before described, it will be necessary to bring line

connected to the two separate plugs, connecting one side of the receiver to the tip of one of these, and the other side of the receiver to the test side of the second plug. Now, proceed in the same manner as we described for locating the point of cross in Figs. 1, 2, 3, etc. It is understood that when making these tests to locate crosses by means of the receiver method, it becomes necessary to connect battery across the wires being tested, if they are of such part of the line circuit, not having both sides of the battery be-

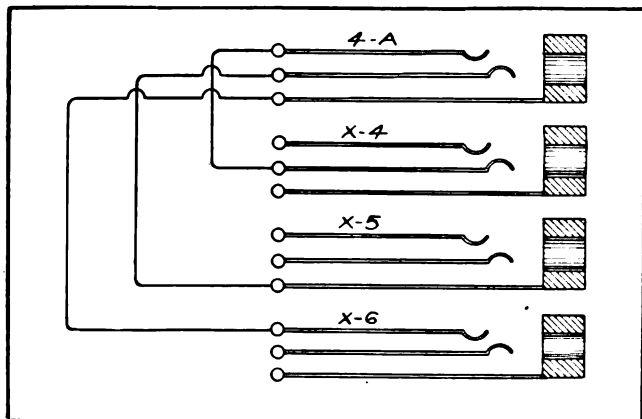


Figure 6.

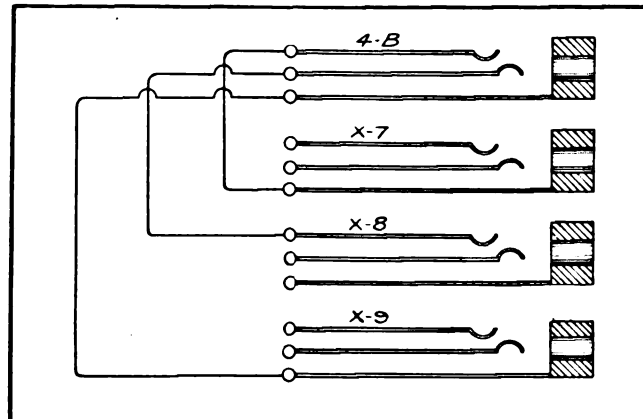


Figure 7.

battery to the tip and test of all of the adjoining lines that are liable to be crossed with the line being tested. When the line, which brings in the trouble, is plugged into it will unbalance the conditions on the sleeve wire that we are listening on, giving rise to clicks in the receiver, which determine that we have found the side of the line bringing in the trouble. When we described the feature of listening on the sleeve of the line we are testing, we mean that one side of the receiver is attached to same, the other side being connected to any point where the grounded side of the battery can be connected to.

A brief explanation of this test would be that, while listening on the line in trouble and plugging in all adjoining lines that are liable to be crossed with same, it will bring in a disturbance in the receiver. When plugging into the line, bringing in the trouble, after determining which side of the adjoining line has brought in the same, it will be necessary to use two plugs, i. e., one in each line when testing to locate the point at which the trouble is brought in; if the cross has been found to exist between the tip of one line and the test of another, plug into the two jacks, with the receiver

tween them; thus, tip and test both being of the same side of battery, it becomes necessary to rearrange same so as to get both sides of the battery between them.

An open circuit in the multiple can also be readily located by means of the receiver method, using the same principles as described for locating crosses. Loose connections and crosses that appear at times only, can also be located by the same method. The idea would then be to listen in the last jack of the multiple, while an assistant is "tapping" the jack of the line in trouble, in each section. This will bring a variation of the resistance of the cross, or a loose connection, giving rise to a disturbance in the receiver. (By "tapping," we mean to have the assistant proceed from one section to another of the switchboard, gently tapping the jack in trouble.)

In making these tests, arrange the wires being tested so as to have both sides of the battery between them. While these tests have been explained, referring in particular to the three-wire system, the principle can be readily applied to the two-wire bridged multiple as well.

TRANSPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION*

BY FRANK F. FOWLE.

III.—THE FIELD OF FORCE AND FLUX DUE TO A TRANSMISSION LINE—WITH REFERENCE TO DIAGRAMS.

AN investigation of the magnetic and static fields about a transmission line will lead to an understanding of the theory of induction. The magnetic force, without a wire which carries the current "I," is expressed by:

$$F = \frac{2I}{r} \quad (5)$$

Where "F" is the force at a point distant "r" perpendicularly from the wire, acting perpendicularly through a plane containing the point and the wire.

Considering the metallic line, we shall have for the force due to two wires, the expression:

$$F = 2I \left(\frac{1}{r_1} - \frac{1}{r_2} \right) \quad (6)$$

Where "F" is the force, "I" is the current traversing up one wire and down the other, r_1 is the perpendicular distance from one wire, and r_2 is the perpendicular distance from the other.

* Paper read at the annual convention of the Association of Railway Telegraph Superintendents, at New Orleans.

By means of this formula the direction and the magnitude of the magnetic field may be determined for all points about the circuit.

The potential at any point without the wires is given by the expression:

$$V = 2q \log \frac{r_2}{r_1} \quad (7)$$

Where "V" is the potential at the point distant r_1 from the wire, whose charge per unit length is q , and distant from the other wire r_2 .

By means of formulæ 6 and 7, the lines of magnetic flux and the lines of electric flux, or respectively the magnetic and the static fields, may be completely determined; and these are given in Figure 1.

The closed lines encircling either wire represent the direction of the magnetic field. The lines which start on either wire and terminate on the other wire represent the static field. The

fall of potential in the dielectric along any static line is continuous from one wire to the other. It will be observed that the static lines and the magnetic lines intersect each other everywhere at right angles, and that any magnetic line is a line of constant static potential.

It will be observed also that the line perpendicular to the line joining the two wires in the diagram is at zero potential.

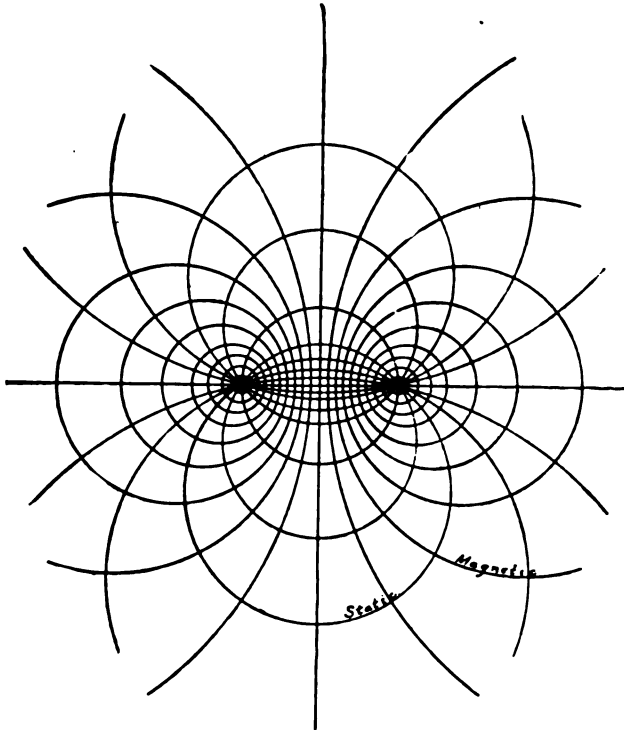


Fig. 1. Showing the direction of the static and the magnetic fields for a metallic circuit.

If it be assumed that this line at zero potential is the surface of the earth, and the wire which would fall within the earth be imagined to have vanished, the field left above the earth will be that due to a single aerial-wire grounded line. This is shown in Figure 2.

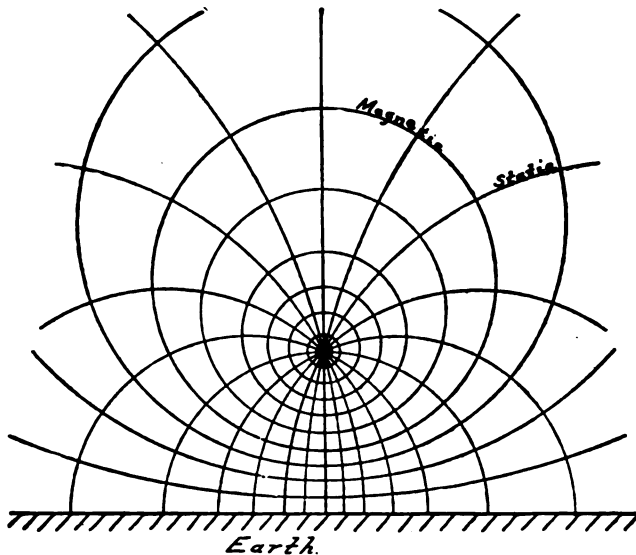


Fig. 2. Showing the direction of the static and the magnetic fields for a grounded circuit, assuming complete penetration into the earth of the return current.

It is important to note that the potential and the flux intensity diminish very rapidly as one passes away from the circuit at right angles. Equation (6) has been put in a little different form in order to show how the flux intensity, that is, the density of the magnetic field, diminishes along the straight line joining the two wires, both between the wires and without the wires. This is shown in Figure 3.

It will be noted that the magnetic density is great only at points very close to the wires and that it diminishes very rapidly passing away from the circuit on either side to a distance several times the distance between the wires.

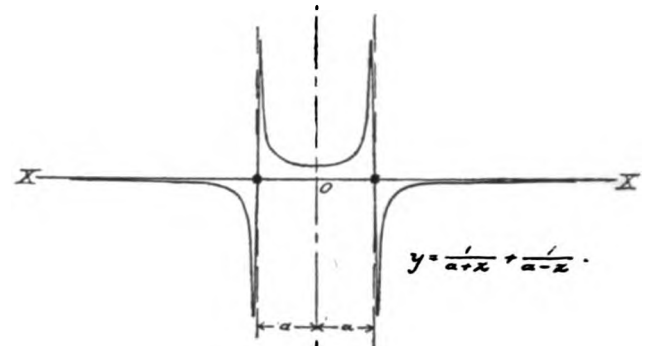


Fig. 3. Showing the intensity of the magnetic field along the X axis, for a metallic circuit.

Expression (7) has likewise been put in form to show how the potential varies along the same straight line joining the two wires. This is shown in Figure 4.

It will be observed that the potential, as well as the density of the magnetic field, diminishes very rapidly at an appreciable

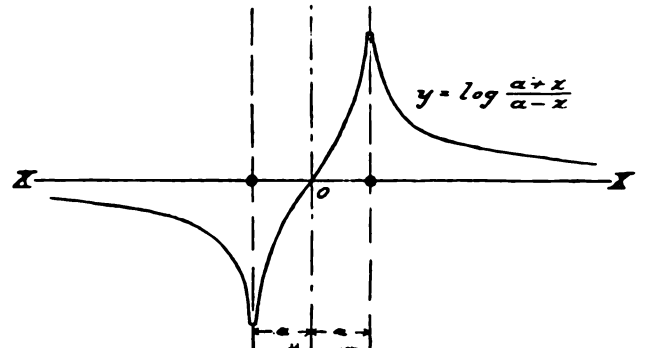


Fig. 4. Showing the potential of the static field along the X axis, for a metallic circuit.

distance from the circuit. This potential is not so small, however, as to be incapable of producing a disturbance in telephonic lines.

IV.—THE REASONS FOR MUTUAL INTERFERENCE
THE FORMULAE OF MUTUAL CAPACITY AND MUTUAL INDUCTANCE: THREE CASES, TWO GROUND LINES, ONE GROUND AND ONE METALLIC LINE, TWO METALLIC LINES.

Considering now the case of a second metallic circuit within the field of the circuit shown in Figure 1: If the two wires of the second circuit lie on a magnetic flux line of the circuit in Figure 1, it is evident that the two wires of the second circuit will be at the same potential and that there will pass between them none of the magnetic flux lines due to the circuit of Figure 1. It follows that these two circuits have no mutual properties and that a current in one, or an electromotive force in one, is without influence on the other.

However, this is not the case when the two wires of the second circuit are in any other relation to the wires of Figure 1. It generally occurs that the wires of the second circuit are in such positions that the static potential at one is not the same as the static potential at the other and that a portion of the magnetic flux due to the circuit of Figure 1 passes through and is linked with the two wires of the second circuit; and this gives rise to a difference of potential between the two wires of the second circuit when an electromotive force is impressed on the first; and it gives rise to a generated electromotive force around the second when there is a change of current in the first.

The magnetic interference is similar to the action of the primary on the secondary winding of a transformer.

The formulæ for the mutual capacity between two metallic aerial circuits, is:

$$-C_{ab} = \frac{2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}}{\left(2 \log_{10} \frac{r_1^2}{r_1^2}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (8)$$

Where C_{ab} is the capacity between the lines, r_{13} is the distance between the wires 1 and 2, r_{14} is the distance between the wires 1 and 3, r_{23} is the distance between wires 2 and 3, r_{24} is the distance between wires 2 and 4, etc.

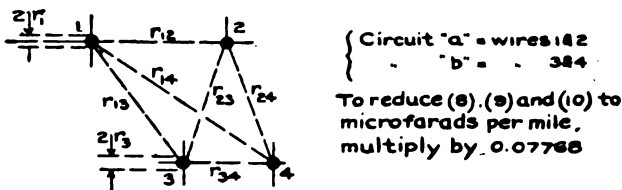
This expression gives the charge which would be induced on each wire of the circuit 3 and 4, due to an impressed electromotive force of one volt between the wires of the circuit 1 and 2. Wires 1 and 2 may be assumed to be the two wires of the circuit shown in Figure 1, and 3 and 4 the two wires of the circuit on which there is an induced charge from circuit one.

The capacity of the circuits, 1, 2, and 3, 4 are both modified slightly from the expressions given in equation (3). The new expressions are (9) and (10).

$$C_a = \frac{2 \log_{10} \frac{r_1^2}{r_1^2}}{\left(2 \log_{10} \frac{r_1^2}{r_1^2}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (9)$$

$$C_b = \frac{2 \log_{10} \frac{r_2^2}{r_2^2}}{\left(2 \log_{10} \frac{r_1^2}{r_1^2}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (10)$$

Where C_a is the capacity of circuit composed of wires 1 and 2, C_b is the capacity of the circuit composed of wires 3 and 4, the characters r_1 and r_2 are respectively the diameters of the wires of circuits 1 and 2, and 3 and 4.



Equations (8), (9) and (10), when multiplied by 0.07768, give capacity in microfarads per mile; and the microfarads per mile are changed to farads per mile by multiplying by 10^{-6} .

The mutual inductance between circuits one and two, and three and four is given by the expression:

$$M_{ab} = 0.3706 \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right) 10^{-3} \quad (11)$$

Where M_{ab} is the mutual inductance in Henries per mile, and r_{14} , r_{23} , r_{13} , r_{24} are the respective distances between wires 1 and 4, wires 2 and 3, wires 1 and 3, and wires 2 and 4, as given above.

The self-inductance of circuits 1 and 2, and 3 and 4 is unchanged and as given in equation (2).

It is evident from equations (8) and (11) that the mutual inductance and the mutual capacity are each zero when the following condition is true, as expressed in the equation:

$$r_{14} r_{23} = r_{13} r_{24} \quad (12)$$

Equation (12) gives the condition under which both the static and the magnetic disturbances between the two lines are zero. It is evident from equation (12) that two metallic lines may be so arranged as to have no mutual interference. If more than two metallic lines are considered, equation (12) must hold between any two pairs in the system.

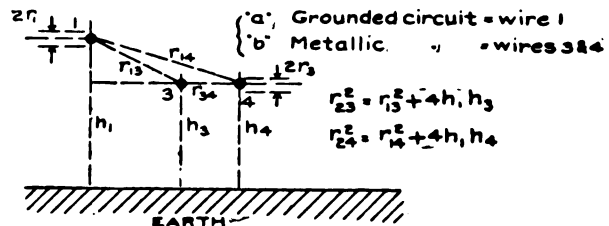
Considering, now, the case of mutual interference between one aerial grounded circuit and one aerial two-wire metallic circuit, it is evident that we may approximate the condition by considering the case of two parallel metallic circuits, of which one metallic circuit has one wire removed to such a great distance that its effect is negligible. The formula for the mutual capacity in this case is as follows:

$$-C_{ab} = \frac{2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (13)$$

The formulæ for the capacity of the grounded line and the metallic line, are:

$$C_a = \frac{2 \log_{10} \frac{r_1^2}{r_1^2}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (14)$$

$$C_b = \frac{2 \log_{10} \frac{2h_1}{r_1}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{r_2^2}{r_2^2}\right) - \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right)^2} \quad (15)$$



To reduce (13), (14) and (15) to microfarads per mile, multiply by 0.07768.

The mutual inductance in this case is given in equation (16).

$$M_{ab} = 0.3706 \left(2 \log_{10} \frac{r_{14} r_{23}}{r_{13} r_{24}}\right) \quad (16)$$

Where wire No. 2 of circuit 1 and 2 is assumed to have been removed to a great distance.

The condition for the mutual non-interference in this case is given in equation (17).

$$r_{14} r_{23} = r_{13} r_{24} \quad (17)$$

Considering the last case of two parallel grounded aerial circuits, the formula for the mutual capacity is given in expression (18).

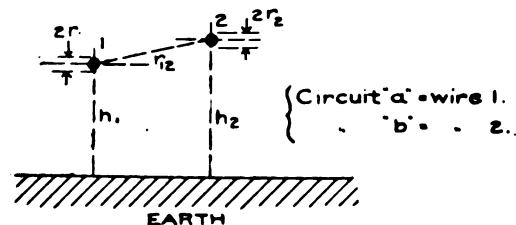
$$-C_{ab} = \frac{2 \log_{10} \frac{2h_{12}}{r_{12}}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{2h_2}{r_2}\right) - \left(2 \log_{10} \frac{2h_{12}}{r_{12}}\right)^2} \quad (18)$$

The formulæ for the self-capacity of each circuit are given in expressions (19) and (20).

$$C_a = \frac{2 \log_{10} \frac{2h_1}{r_1}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{2h_2}{r_2}\right) - \left(2 \log_{10} \frac{2h_{12}}{r_{12}}\right)^2} \quad (19)$$

$$C_b = \frac{2 \log_{10} \frac{2h_2}{r_2}}{\left(2 \log_{10} \frac{2h_1}{r_1}\right) \left(2 \log_{10} \frac{2h_2}{r_2}\right) - \left(2 \log_{10} \frac{2h_{12}}{r_{12}}\right)^2} \quad (20)$$

The expression for the mutual inductance in this case is given by equation (21).



$$2h_{12} \sqrt{r_1^2 + 4h_1 h_2}$$

To reduce (18), (19) and (20) to microfarads per mile, multiply by 0.07768.

$$M_{ab} = 0.3706 \left(\log_{10} \frac{4h_1 h_2}{r_1^2}\right) 10^{-3} \quad (21)$$

The self-inductance of the two circuits is unaltered, and is given in expression (1).

In treating the case of induction from circuits energized by simple alternating currents, the induced currents in a neighboring circuit are given by the following formulæ:

If the mutual inductance is M and the current in the disturbing circuit is I , the induced electromotive force is—

$$E_2 = M_{ab} \omega I_1$$

where $\omega = 2\pi n$

n = frequency, in cycles per second of inducing current (22)

The electromotive force acts in such manner as to produce a current flow around through the disturbed circuit.

If the mutual capacity is C_{ab} , the transfer of current from the disturbing to the disturbed circuit—that is, from the inducing circuit to the circuit in which there is an induced current, is—

$$I_2 = C_{ab} \omega E_1$$

(23)

Where I_2 is the total induced current in the second, or disturbed circuit, C_{ab} is the mutual capacity, and E_1 is the impressed E. M. F. on the primary, or disturbing circuit. The current I_2 does not flow around the second circuit, but divides and a portion of it flows toward each terminal.

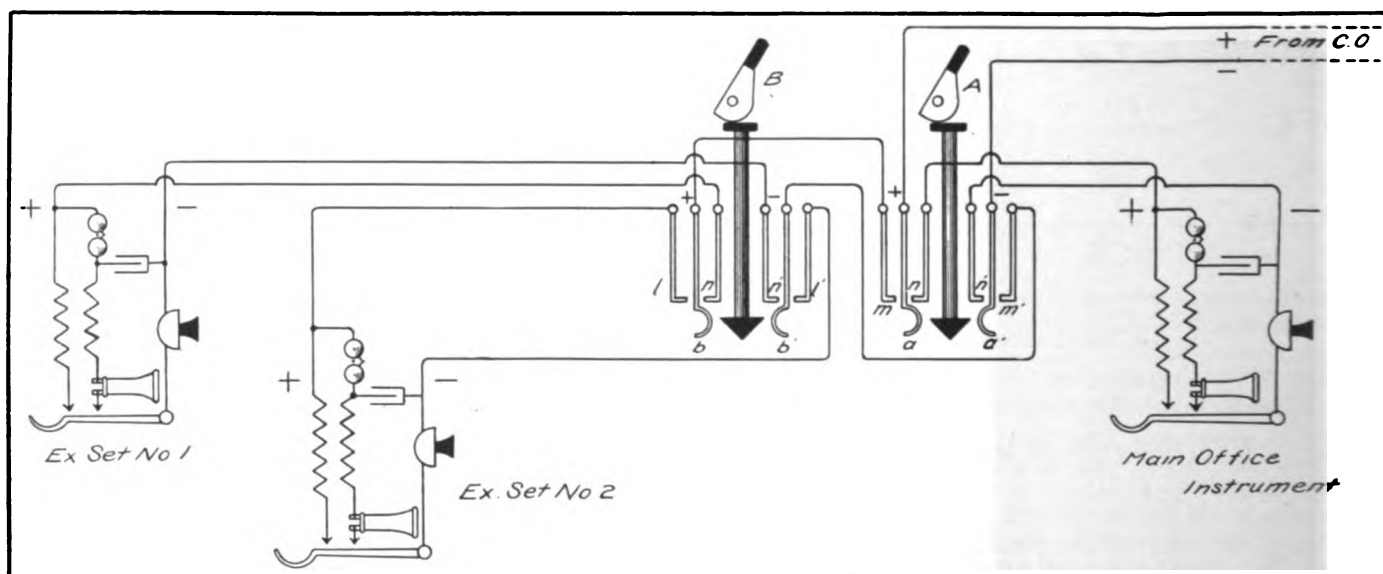
The foregoing formulæ of mutual capacity, mutual inductance, the induced E. M. F. and the induced current, provide the necessary data for determining the magnitude of the induced E. M. F. and current in simple cases of induction where the primary or disturbing circuit is energized by a simple sinusoidal alternating current.

SELECTIVE KEY FOR EXTENSION SETS

By F. R. PINE.

THE accompanying diagram shows a method of arranging a subscriber's main telephone set, and two extension sets, by means of two ordinary keys, to give privacy on each telephone. We will say the main set is in the business man's private office, and the extension sets located in different parts of his establishment. When he is in his office, the key *A* is left in its normal position, which allows the office instrument to be connected with the telephone exchange, but cuts off the two extension

sets. When a man leaves his office to visit some other part of his establishment, he generally knows to what part of the place he is going, and can set the keys accordingly. On key *A*, springs *a*, and *a'* are cut in on the line from the central office. *N* and *N'* are the normal contacts, connecting with the main office instrument. When the cam of key *A* is thrown down, the normal contacts are opened, thus cutting off the office



sets. When he leaves the office to go to some other part of the building, the cam on key *A* is thrown down, thus disconnecting the office telephone, and cutting in either one or the other of the two extension sets. With key *B* in its normal position, extension set No. 1 is connected with the exchange, and the other set is cut out. With key *B* thrown down, extension set No. 2 is cut in, and the other is cut out.

The proper positions of cams for their respective instruments

instrument, and making contact between *a*, and *a'*, and *m* and *m'*. This throws the extension sets in circuit with the telephone exchange. With key *B* in its normal position, springs *b*, and *b'* are in contact with the normals *N*, and *N'*, thus cutting in extension set No. 1. With the cam of key *B* thrown down, the normals are opened, and contact is made between *b*, and *b'*, and *l*, and *l'*, which will connect extension set No. 2 with the central office.

UNITED STATES TELEPHONE ANNUAL MEETING.

THE annual meeting of the United States Telephone Company was held recently at the office of the company in the Electric Building, Cleveland, Ohio. The election of officers and directors was also held, and the following board was appointed: H. A. Everett, E. W. Moore, J. B. Hanna, C. W. Wason, B. Mahler, J. W. Marsh, James B. Hoge, F. S. Dickinson, James R. Sprinkle. Following are the officers appointed at the organization meeting: F. S. Dickson, president; E. W. Moore, vice-president; James B. Hoge, secretary; R. W. Judd, treasurer.

The one change in the board is caused by the resignation of M. Reber, former vice-president of the company. Mr. Reber

will return to St. Louis, his former home, and his place on the directorate was filled by the appointment of James B. Hoge. E. W. Moore was elected vice-president, succeeding Mr. Reber. The statement of the company for the year 1903 showed the gross earnings for that period to have been \$379,235.10, an increase of \$76,838.85 over the gross earnings for 1902. The increase in the total income for 1903 over 1902 is \$17,165.48. General expenses for 1903 were \$25,165.07, against \$20,538.30 the year before.

The surplus per balance sheet for 1903 was \$15,972.18. The year before a deficit of \$21,138.32 existed, making a difference of \$37,110.50.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



BUSY TEST ON B POSITION.—(294.)

The way I understand it there are no listening keys on B positions in modern common battery boards. How is it then that the B position operator gets busy test? Please show circuit.

M. N. O.

In modern common battery switchboards, the test circuit of one of which is shown, the busy test is obtained by means of an extra secondary winding on the operator's induction coil. Referring to the diagram (Fig. 294), it will be seen that the sleeve conductor of the incoming trunk plug is wired in series with the winding of a relay. This relay carries three contacts, and to the

on lines which are wholly or in part aerial. In many cases the insertion of protection is compulsory by law and is always advisable.

HUMMING OF WIRES.—(297.)

I find the old standard anti-hum is not entirely effectual. What will stop the humming completely?

E. F. E.

All of the anti-hum devices are based upon the plan of surrounding the objectionable wire with rubber or other such substance as would take up the vibrations. You can undoubtedly

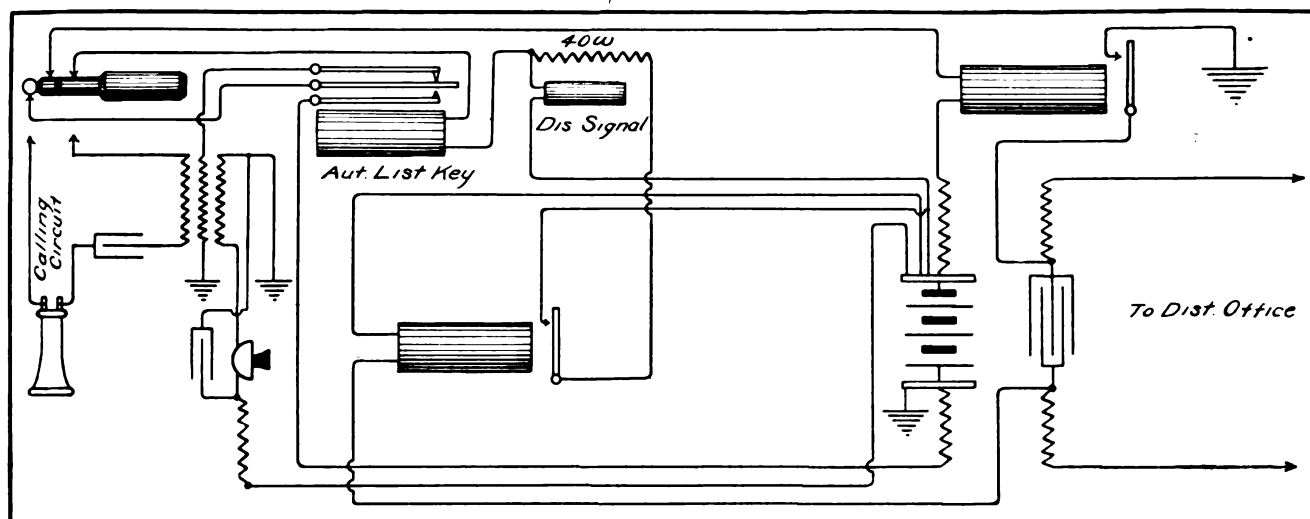


Figure 294.

center one is connected the tip strand of the trunk. The outside or normal contact is connected to the special secondary winding the free end of which is grounded. The inside contact connects through the trunk repeating coil to the grounded side of the battery. From an inspection of the diagram it will be seen that should an operator test a busy line by touching the sleeve of its jack with the tip of a trunk plug that there will be a path to ground through the special secondary, and that the operator will get the click in her receiver. Should the test show the line to be free and the trunk plugged up, the relay in the sleeve strand will operate, cut off the busy test secondary and close the circuit of the tip strand of the trunk. This relay is often called the automatic listening key.

plan an indefinite number to suit your case. You might try the device described in our issue of January 23, 1904, page 55. One of our subscribers recently suggested that he found that if he spliced a piece of insulated wire to the line wire and made up the covered wire around the insulator, that the vibrations from the line wire were deadened and did not disturb the inmates of the building on which the wire was fastened.

BALANCE OF LINES.—(298.)

A five mile rural line first is built with No. 12 B. B. W and M. for grounded circuit. Within a year adding another wire No. 12 B. B. Roebing's for metallic circuit is contemplated. Will the two sides balance, and is it "all right"?

G. B.

OHMMETER RESISTANCE WIRE.—(295.)

In connection with the ohmmeter described in your issue of Dec. 5, 1903, I would like to ask the following question: Is the resistance wire "A-B" (10 feet long) one piece of wire formed in the manner shown in Fig. 295 at A or is it cut into five pieces as shown at B, and the ends soldered to the cross plates P, P, P, P. If the latter be the case do not the cross plates offer some resistance and should not they be included in the scale?

The resistance wire in the ohmmeter to which you refer is connected by brass straps placed across the ends of the wire as shown in the sketch, at B. Theoretically you are perfectly correct in the assumption that the resistance of these pieces should be taken into account, but by making the pieces wide and thick and the space between the two wires short, the resistance of these clamping bars becomes so small that it is practically inappreciable.

LIGHTNING ARRESTERS ON LINES.—(296.)

Are there any lightning arresters that are absolutely certain in action?

S. K. E.

There are no human devices which are infallible, consequently there is no lightning arrester which is absolutely certain. The modern practice advises the introduction of lightning arresters

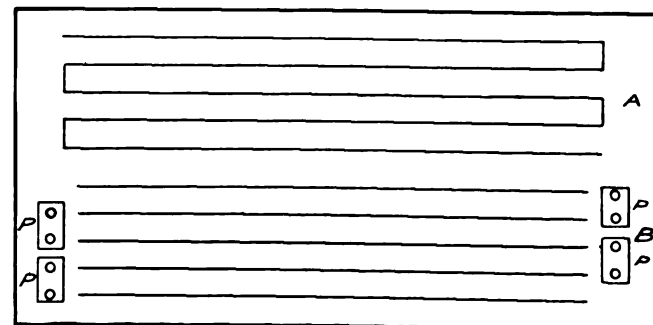


Figure 295.

There is no practical difference in iron wire whether manufactured by one maker or another, provided it is of the same trade grade. While minute differences in chemical compositions may occur they are uneffective practically. To add another wire of a different manufacture to the one which you have will make a properly balanced line so far as the wire is concerned, but care must be taken to distribute other appliances properly.



THE INDEPENDENTS' GROWTH.

DURING the past two months THE AMERICAN TELEPHONE JOURNAL has been able to devote considerable space to the annual conventions of various State associations of Independent telephone companies. The several accounts, demonstrating the marvelous growth of the Independent telephone movement, would make instructive reading for the Boston stockholders of the American Telephone and Telegraph Company, many of whom seem to have no proper conception of what Independent telephony means beyond a vague idea that it has obtained some foothold in the benighted West. A perusal of recent numbers of THE AMERICAN TELEPHONE JOURNAL would certainly open the eyes of these Bell investors until they would be ready to exclaim with Mr. Cleveland, "a condition and not a theory confronts us."

As a matter of fact the development indicated by these various conventions has been something of a surprise even to the friends of Independent telephony, who nevertheless expected great things. The Independent operators have been too busy developing their respective home territories to give more than passing thought to the field in general.

Yet, at this time, a bird's-eye view of the situation in the West may be both encouraging and profitable. It is something to know that in Nebraska, where five years ago there were only five Independent companies in the State endeavoring to do business, with a mileage of less than two hundred, there are to-day over three thousand miles of Independent lines which traverse almost the entire State.

Even younger is the Kansas Independent Association. The third annual convention was held at Topeka several weeks ago, and demonstrated that the State is pretty well covered with Independent systems, whose business actually doubled during the past year. Coming east to Wisconsin, we find that in that great State in two years ninety new Independent companies have been incorporated, with a capitalization of a million and a half dollars, bringing the total number of Independent companies up to two hundred and fifty.

In the Ohio convention, held at Cincinnati, some one hundred and fifty operating companies were represented, and the reports received showed the same phenomenal increase. The State convention of the Michigan Independents, held at Grand Rapids, had the largest attendance in the history of the association. The report of President Fisher showed a net increase of over ten thousand telephones during the year. From Missouri, Kentucky, Indiana, New York, come the same encouraging and surprising reports.

And yet the most significant development in the successive conventions was not the phenomenal growth of the Independent companies with respect to their local territories, but the spontaneous and persistent movement toward long distance toll service. Illinois Independents have had no Independent connection with that great market, St. Louis. Illinois, Wisconsin, Michigan, Indiana, and the other great States of the Mississippi valley have had no Independent lines to Chicago, that important commercial center, and the Mecca of the hopes of Independent telephony in the West. There has not been until recently communication between any of the States over Independent lines. In this

THE TOLL BUSINESS INCREASE.

respect alone has the Independent service been found wanting. In local service everywhere the Independents have been always equal and usually superior to the Bell companies. In long distance

service from the very nature of things they have not been able to meet the demands.

But now, out of this seemingly disorganized mass of Independent companies, we find there is being rapidly evolved long distance possibilities that are simply enormous. By July all of the surrounding States will be talking with Chicago over Independent lines. Before July Illinois will be talking with St. Louis. Moreover, we are promised that before the year is out it will be possible to talk from Philadelphia to Kansas City and Topeka, Kansas; from Albany, New York, to St. Paul, Minnesota; from Chicago, by way of St. Louis, to San Antonio, Texas, and Galveston; in fact, everywhere east of the Rocky Mountains, where there are Independent telephone lines to talk over. When this is accomplished, there will be occasion for rejoicing, not only on the part of Independent operators, but of the commercial world generally. Because the telephone is to become more and more a tremendous factor in business development.

It is noticeable also that in all these conventions the "Independent" feeling ran very strong. Naturally this would be the case, for there can never be any sympathy between Independents and a foe which has been so persistent and malicious as has the Bell monopoly. But we find in the Michigan convention this sentiment cropping out in a resolution "condemning the practice of the manufacturers and jobbers in telephone apparatus in any way encouraging or assisting competition to Independent interests, and requesting all such not to knowingly sell telephone apparatus to be used in competition with any successful Independent exchange."

This resolution deals with one phase of Bell competition, or rather warfare, whereby so-called Independent companies are fostered by the Bell people in order that they may cut into the business of successful Independent operators, or finally fall into the hands of the sheriff to the great discouragement of investors.

Another phase of this competition might have been similarly discouraged. A resolution might have been adopted recommending that no reputable Independent telephone operator be guilty of ordering supplies from a Bell concern, like the Kellogg Switchboard and Supply Company, which still continues to pose as an Independent company, notwithstanding the thorough exposition of its methods made through these columns.

This may not have been thought necessary, for Independent operators have their eyes open, not only to the present, but to the future, and they feel very deeply in this matter. Their future lies along the lines of co-operation and the recognition of mutual interests, not in helping to build up a company which is owned by the Bell people. They are not to any alarming extent rushing to put themselves into their rival's power. Few, if any of them, feel disposed to give up the secrets of their credit to a Bell concern from which the information could easily find its way back to the manager of the competing Bell company and thus become a dangerous club in the hands of an unscrupulous rival.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

DAMAGES FOR BROKEN POLE.

OUR company, which operates in Vermont, is incorporated by a special act of the State Legislature. We have a pole located in the street of the village; a team left standing alone by its owner runs away, and coming in contact with the pole, breaks it, compelling us to replace it with another. Is the owner of the team liable for the damage and expense incurred by us?

THE owner of the team would be liable. It is the natural propensity of horses left untied in the street to run away. The act of the owner in leaving his team untied was therefore negligence, and he is liable for whatever damages they may do, if the damage is such as might have been foreseen. In this case the breaking of the pole was a very likely outcome of the runaway.

A TELEPHONE COMPANY WHICH IS NOT A COMMON CARRIER.

JUDGE ARTMAN, of the Boone county, Indiana, Circuit Court, in the suit of the Thorntown Co-operative Telephone Company against the Lebanon Telephone Company for a writ of mandate, rendered a decision favorable to the defendant.

In 1897 the Lebanon Company entered into a contract with the Thorntown Independent Company, whereby the latter was to be granted exclusive service between Lebanon and Thorntown. Later the Thorntown Co-operative Company applied for admission to the Lebanon Company's switchboard, but was refused, on the ground that the contract with the other company rendered it impossible to grant such a service. The Co-operative Company applied for a writ of mandate to compel the Lebanon Company to give connection, and in the complaint made allegations to show that the Lebanon Company was a common carrier, and as such could not discriminate against companies asking admission to its switchboard.

In making up the issues of the case the plaintiff won a victory, Judge Artman holding that if the allegations in the complaint were true the Lebanon Company was a common carrier and as such was bound to grant connections to all companies asking admission.

The case was then tried on the question of fact and after due deliberation Judge Artman rendered a special finding, holding in effect that the allegations in the complaint were not sustained by the evidence and that it had not been established as a matter of fact that the Lebanon Company was a common carrier. His verdict was for the defendant. An appeal will now be taken to the Supreme Court.

MANDAMUS TO A CITY COUNCIL.

IN the case of the Tri-State Telegraph and Telephone Company vs. the City of Owatonna, Minn., brought by the company to compel the city council to grant it a franchise to construct its line through the city, Judge Buckham has decided against the city on the motion to quash the alternative writ of mandamus and for the city on the demurrer of the company to the city's answer. This leaves the question before the court to be tried on its merits.

The court holds that the State has the undoubted power to legally delegate to municipalities its original element of control over its public thoroughfares, even to the power of excluding poles and wires entirely from urban streets (81 Minn. 152), that it has delegated to the city of Owatonna full authority in this respect, and that it is elementary that mandamus will never lie to control discretion. But the information in this case alleges that

there has been no exercise of discretion by the city authorities, that their refusal was arbitrary and dishonest, and not a fair and reasonable exercise of their municipal authority. These allegations and their denial in the answer raise issues that the court considered plaintiff entitled to have tried.

The court said that the company's main contention was that it had an absolute right under the general statutes of the State to use the streets and alleys of the city for the erection and maintenance of its poles and wires, subject only to the police power to regulate such use and that under the proper exercise of the police power not even the State could deprive it of this right. This question the court held decided by *Duluth vs. Telephone Company*, 84 Minn. 486.

The answer was sustained on the final ground that it puts in issue the company's allegations that the city had dishonestly and arbitrarily refused the franchise. Such allegations duly denied raise a proper issue for trial. *N. W. Telephone Co. vs. Minneapolis*, 81 Minn. 140.

TREES MAY BE REASONABLY TRIMMED IN IOWA.

THE Supreme Court of Iowa has held that a telephone company may trim to a reasonable extent the limbs and branches of trees that interfere with the construction of its line. One Meyer sued the Standard Telephone Company to recover damages for the careless and wilful cutting of trees by the employees of the company. The defendant pleaded that it had the right to use the highway in front of plaintiff's property, that in so doing it had the right to cut and trim some trees in order to erect its line, and denied any careless and needless cutting.

Plaintiff recovered and defendant appealed. The question arose upon the instructions of the court to the jury. An instruction permitting the allowance of damages for the reasonable as well as the unreasonable cutting of trees was held incorrect. The court said that the difference in the value of the land after defendant had trimmed and cut, as it was entitled to do under the law, and the value of the land after the unauthorized cutting was the true measure of damages.

Meyer vs. Standard Telephone Company (Ia.), 98 N. W. 300.

WIFE STOPS HUSBAND CALLING HER OVER TELEPHONE.

AT Hamilton, Ohio, Mary McGee has brought suit against her husband, George H. McGee, for divorce. She also asks that he be enjoined from calling her up and abusing her over the telephone, as she claims he has been in the habit of doing.

NUMBER OF WITNESSES DOES NOT MAKE PREPONDERANCE.

THE Supreme Court of New Jersey has decided that the questions of negligence of servants of a telephone company in handling a reel of wire and contributory negligence of the plaintiff in an action for damages is a question for the jury and not for the court. It also held in the same case that the fact that the witnesses for the defendant outnumbered those called for the plaintiff, standing alone, afforded no reason for discrediting the finding of the jury.

Campbell vs. Delaware & Atlantic Telegraph & Telephone Co., 56 A. 303.



IN THE OPERATING FIELD.

CUYAHOGA'S NEW RATE SCHEDULE.

IN Cincinnati the Cuyahoga Telephone Company will revise its rates with the cutting in of the new board, and all new contracts, whether for new or old subscribers, will be taken in accordance with this table:

	Unlimited Service		Measured Service.	
	Quarterly		150 Calls Quarterly.	
	Business.	Residence.	Business.	Residence.
One-Party	\$18.00	12.00	\$15.00	\$10.50
Two "	13.50	9.00	11.25	8.25
Four "	9.00	6.00	7.50	5.25

In the past telephone companies have been charging for what is known as "extra name service," that is, they have been in the habit of charging a single rate for all extra names in the telephone directory, and the Cuyahoga Company does not deem this just. To handle such service they propose to charge for each extra name \$10.00 a year. Where the subscriber, however, acting for instance, as a manufacturer's agent, desires not only to have his name in the directory, but also the names of the corporations he represents, the charge for such extra names will be \$3.00 a year. Where the subscriber to a business telephone desires to have the names of the members of the firm or officers of the corporation inserted in the directory, no charge whatever will be made for inserting four such additional names. Each extra name in excess of four will be inserted at \$3.00 a year. Extra names on residence telephones will be inserted at \$5.00 a year. Where a party has a telephone and wishes to have an extension telephone in a nearby location, a charge of \$8.00 a year will be made for the extension instrument, no matter what the type of service. When an extension bell is desired, a charge of \$3.00 a year will be made for it, providing the wiring does not have to be carried too far from the telephone. In case of an excessive run of wire an extra charge can be made.

HANDLING A TELEPHONE BUSINESS.

By A. M. LUCAS, JR.

DURING many years of experience in different branches of telephone work I have noted the many mistakes that telephone companies have made in their handling of traffic. In their eagerness to secure business contracts of any nature have been accepted. Frequently business is solicited and a contract secured that is absolutely worthless. Every company should invariably require at least the first quarter's rental in advance. Many companies may say this is impossible, but it is not. Educate your subscribers to the idea of paying in advance and you will have less trouble in the collection of your rentals. I have adhered strictly to this rule and have succeeded in building up several companies to where but little revenue was lost, and at the same time getting them on a paying basis. To install a station and collect no revenue means a dead loss to the company. A merchant never extends credit to his customers unless they give satisfactory references; then why should not a telephone company be just as exacting? Another mistake is when a subscriber is given a period of free service. Why should this be done? Can this question be answered satisfactorily? You pay for your gas or electric lights from the time they are turned on, and your house rent begins when you move in, and the same in every other line. All contracts should date from installation. Nothing

is to be gained by giving free service, yet it is done by many companies. Taking the question as to the class of men to be employed in telephone soliciting, it might be well to state that many telephone companies have made the serious mistake of securing cheap labor. It is just as essential that a solicitor be a man of ability as it is that your engineer be an electrician or that your manager possess executive powers. A successful telephone solicitor must be an able man, who can cope with the competitor at all times. He should be an extremely good conversationalist, well read, and acquainted with the local conditions, and able to take any proposition and with ease present it on its merits. At the same time he should be a diplomat. This class of men can be secured and can defeat opposition, but just so long as companies insist upon the employment of low-salaried solicitors they will continue to have trouble.

A GOOD SUGGESTION.

MANAGER THORWARD, of the Home Telephone Co., of South Bend, Ind., offers a suggestion to the central energy telephone subscribers that is well to bear in mind. In the event one should be visited by thieves or holdupmen, simply take the telephone receiver from the hook. This flashes a light in the exchange, attracting the attention of the operator. If she fails to gain a response to her call she will listen, and if there is an indication of anything wrong, will notify the police.

ABOUT CLASSIFIED TELEPHONE DIRECTORIES.

ONE thing is very sure," says the Hartford, Conn., *Courant* in speaking of Independent telephone companies, "that the Independent concerns understand well how business ought to be done so far as the public are concerned, and give them the worth of their money. The directory of the new company at Springfield, Ill., is at hand. Each subscriber has a separate wire and all are up-to-date metallic circuits. The directory, as things are now going, is issued monthly instead of quarterly, because the subscribers are increasing so rapidly. This directory gives each subscriber's name in an alphabetical list and then, after that, classifies all subscribers alphabetically and adds this classified list. If you want a livery stable or a restaurant or a lawyer, look under those heads and find what you want. This is an immense convenience and incidentally it helps the telephone company, because it frequently shows people where to find what otherwise they would have to go without, perhaps through their fault, perhaps through the fault of the directory. We still believe that in the long run the best purpose of the telephone is served by finding uses for it, although the contention is made from within that telephoning is the one business where increased use means expense increased in still greater ratio.

"But the Springfield directory is not an exception. We happen to have at hand directories of the Independent companies at a number of other places.

"The Kinloch Company, Independent, of St. Louis, has 205 pages of classified list, beside its alphabetical list.

"The Twin City Company, Independent, of Minneapolis and St. Paul, has 84 pages of classification for the former city and 29 pages for St. Paul.

"The Independent Telephone Company, of Seattle, Wash., has twenty-one pages of classification in small type, enabling the subscriber to find whatever he is after.

"The Independent Telephone Company of Aurora, Ill., located

in a town of about 30,000 population, has eight pages of classified names.

"The Akron People's Telephone Company, Independent, in a town of about 45,000 people, has 3,500 subscribers in its territory, and it gives up nine pages to its classified list.

"They all do it, and where the Independent company gets in work of that sort, it forces the old company to get up and give the same accommodation."

AUBURN COMPANY'S NEW BUILDING.

WITHIN two or three weeks the handsome two-story fire-proof building for the Auburn, N. Y., Telephone Company will be finished. The front is of Venetian style, with very handsome marble columns. The building will be used exclusively for telephone purposes, the ground floor containing the offices of the company, public pay station booths, as well as a large store room. The second floor is given up entirely to the operating room, which will contain the automatic switchboards, distributing board, ringing machines, etc., put out by the Automatic Electric Company, of Chicago, as well as the toll board. The upper floor is lighted by three large skylights. The basement, which extends from the curb to the rear of the lot, is given up to storage and construction paraphernalia, being reached by a hydraulic lift in the sidewalk.

ATTORNEY INSTALLS INDEPENDENT BRANCH EXCHANGE ON BELL WIRES.

IN Chicago, Ill., Charles A. Brown, a prominent attorney, has, regardless of the Chicago Telephone Company's rule to the contrary, connected his own branch exchange to its wires, and has been granted an injunction restraining the company from discontinuing its exchange service. No effort has been made by the company to dissolve the injunction. Mr. Brown has made the following statement in regard to the matter:

The Chicago Telephone Company has a franchise under which it is operating in Chicago, which requires that it furnish unlimited service at \$1.25 a year. I wished to have connected with the single exchange line and telephone a number of extension telephones to be operated from the desks of myself and my clerks in various rooms in my offices. I was told that the basis on which this service would be furnished was at the rate of \$72 per annum for rental of the lines, \$72 per annum for the rental of the switchboard, \$12 per annum for the rental of each instrument, and three cents a message for each outgoing call. This seemed to be an unreasonable charge, particularly inasmuch as the use of the extension telephones upon the desks of the various employees in my office who would use them really saves time and attention on the part of the telephone operator in permitting more prompt response to the telephone and generally facilitating the operation of the telephone.

I asked the Chicago Telephone Company whether I would be permitted to connect with the telephone exchange instruments not furnished by that company and was told that that would not be permitted, and was further warned that if I attempted to make connection in that way with the exchange line my service would be instantly discontinued.

I found that for a reasonable outlay I could secure from the Stromberg-Carlson Telephone Manufacturing Company instruments which are better than those furnished by the Chicago Telephone Company, and that the private branch exchange complete could be installed for a good deal less than one year's charge under the schedule which the Chicago Telephone Company proposed. I would then own the private branch exchange and would have better instruments than the Chicago Telephone Company furnishes, and would have improved facilities for using the telephone in my office, without in any way burdening the Chicago Telephone Company. I therefore had this private branch exchange installed at my own expense, and simultaneously with the connection of this exchange to the wire from the Chicago Telephone Company's exchange I filed a bill and applied for an injunction (which was granted) to prevent the Chicago Telephone Company from carrying out its threat and discontinuing my exchange service. This is the condition of affairs at present, as no move has been made by the Chicago Telephone Company to dissolve the injunction.

The Chicago Telephone Company is deriving a very large revenue from private branch exchanges in this territory to which it would have no legal right, in my opinion, if it were not for the submission to the extortion by the subscribers of the Chicago Telephone Company.

CANTON, N. Y., MUTUAL TELEPHONES.

AT present Canton, N. Y., is the central figure in several mutual telephone schemes. The Bradford County Independent Company is anxious to get into Canton and has made a favorable proposition to the Canton and Leroy companies to connect with them at West Franklyn. The Bradford

Company was recently formed. The indications are that the connections will be made and that the work will begin within a month. The several mutual companies will no doubt establish a joint exchange at Canton with a reciprocating system of charges so that all using their telephones will get service at the very lowest cost. In addition to this the several systems will have the services of an expert electrician available to keep the lines in first-class condition. The joint system will accommodate 300 subscribers.

CROSSED WITH HIS WATER PIPE.

RECENTLY an installer had occasion to enter an old subscriber's house to place a ground wire on his telephone in order to place another subscriber on his line and have the bells ring selectively. The man took a great interest in the operation of attaching the wire from a water pipe in the basement to his telephone. The job was completed and the other subscriber placed on the same line but nothing said to the man about it. Several days later he came into the office wearing a worried expression and said that wire must come off his water pipe immediately, for when he tried to get Central he heard someone talking, and was certain someone was crossed up with his water pipe.

TELEPHONE SYSTEM WILL SAVE C. M. & ST. PAUL RAILROAD MONEY.

THE Chicago, Milwaukee and St. Paul Railway Company will supplant the telegraph offices on its line from Madison, Wis., to Portage, by a telephone system, commencing March 1. All train orders and telegraph business will be conducted by means of the telephone, and those operators who receive messages for transmission will telephone them to the central at Arlington and from there they will be sent by wire. The stations along the line are small and the telegraphers had demanded a considerable increase in wages which the company would not pay, so will install the telephone system.

CUMBERLAND TRIES TO ENTER CAMDEN, TENN.

BECAUSE the City Council of Camden, Tenn., refused to grant the Cumberland Telephone & Telegraph Company a gratis franchise for an exchange, the company withdrew from the town. Four or five years ago the people of Camden asked the company to put an exchange here, and they refused to do so, notwithstanding the fact that they then had at that place a regular pay station. Thereupon the citizens organized a stock company for an exchange for their own convenience, and which did not pay them anything on their investment for several years. Now, as it has begun to pay a dividend, the Cumberland Telephone & Telegraph Company wants to come in. The company has withdrawn from the town and the citizens are using their own and the Western Union Telegraph Company wires to carry their messages. Recently a Humphreys County telephone company made application for a franchise, and as the City Council were of the opinion that the Cumberland had something to do with it refused to entertain the proposition at all.

ALLEGED INFRINGEMENT OF PAY STATION SIGNAL DEVICE.

THE Gray Telephone Pay Station Company, of Hartford, Conn., has instituted proceedings in the United States Circuit Court against the Southern New England Telephone Company, of Connecticut, and the Baird Manufacturing Company, of Chicago, for alleged infringement of patents. The claimed infringement relates to signal devices that are used in pay stations. The Gray company claims rights under a priority of patent. An injunction is asked for.

GERMAN TELEPHONE OPERATORS.

TELEPHONE operators to the number of 4,000 in Germany are government employees. Each must be of good character and live in a respectable family. The pay is 53½ cents a day, with an advance of 6 cents in two years, and those four years in service secure 71 cents a day. Applicants for these positions usually wait two years for an opening.

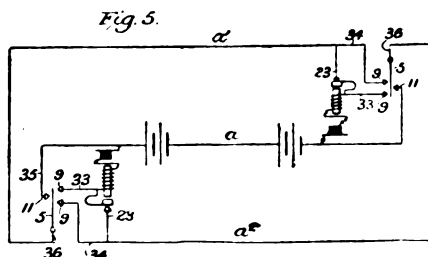
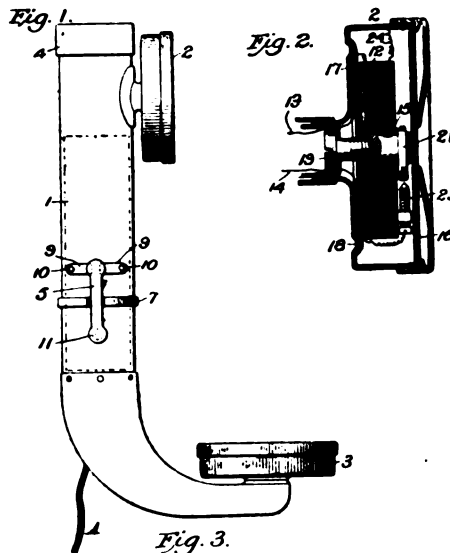
TELEPHONE



PATENTS

PORTABLE TELEPHONE.

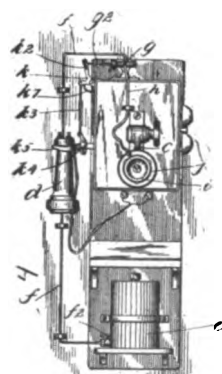
E. T. Billig, New York, patents (No. 751,829) an improved portable telephone. This invention is illustrated in Figs. 1 and 2; the object of this invention being to provide a combined receiver, transmitter and telephone signal. The receiver 2, is supported upon the handle 1, which is hollow and made of such size as to



contain portable dry batteries. A switch 5, is provided, containing a contact which, if pressed, sends battery current over the line. A section of the receiver is shown in Fig. 2, in which 21 is a circular spring surrounding the magnet 15, which forms a kind of buzzer, so that by pressing the switch 5, this buzzer is caused to emit a sound which is given forth by the receiver and forms a telephone call.

IMPROVED DISINFECTING ATTACHMENT FOR TELEPHONES.

C. Bravi-Bertini, Perth Amboy, N. J., patents (No. 753,466) an improved attachment for disinfecting telephonic instruments.



This device is shown in the figure and consists of a can *e* which is filled with the prepared disinfecting fluid. From this can a pipe *f* extends along the side to the valve *g*. This valve is con-

nected by means of the lever *k*3 with the switchboard, so that when the hook raises and falls the valve is operated. There is also a small pipe *h* from the valve *g* to the transmitter, the mouth piece of which is surrounded with a perforated ring very much after the plan of a water cart. Whenever the receiver is removed from the hook-switch the operation of the valve squirts a dose of the disinfection into the transmitter.

JACK FOR TELEPHONE SWITCHBOARDS.

L. M. Ericsson patents (No. 753,562) and assigns to the Ericsson Company, Stockholm, an improved method of mounting switchboard jack. This invention is shown in Figs. 1 and 2. 1 is a plate that forms the support for the jacks. 4 4 are thimbles

Fig. 1.

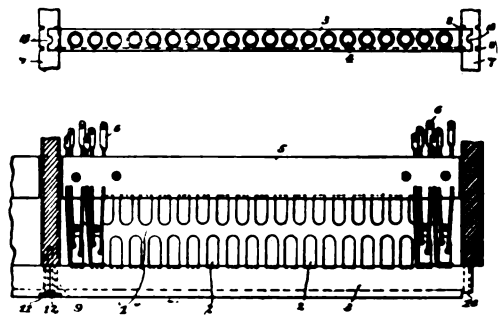
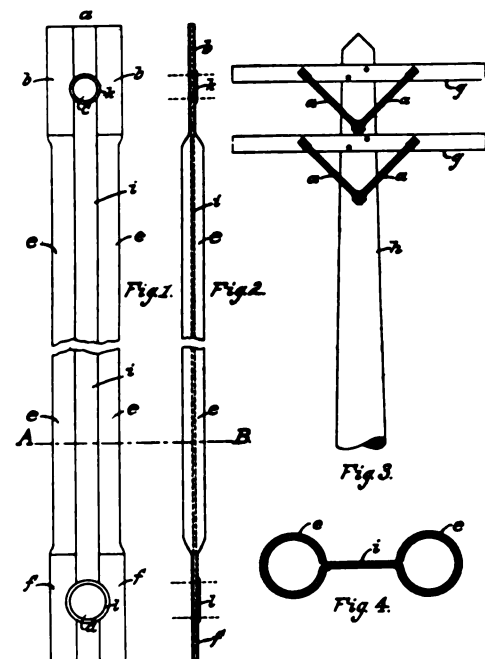


Fig. 2.

forming the test rings which are pressed into a front strip, 3, of ebonite. Secured to the plate 1 there is a tail piece 5, also secured to the plate which carries the springs 6. When the jacks are assembled each strip is supported to the standards 7.

IMPROVED CROSS ARM BRACE.

Frank B. Cook, Chicago, Ill., patents (No. 752,655) an improved cross arm brace. This invention is illustrated in Figs. 1, 2, 3, and 4. Fig. 1 is a front elevation of the brace. Fig. 2 is a side elevation. Fig. 4 is an enlarged detail and Fig. 3 is the

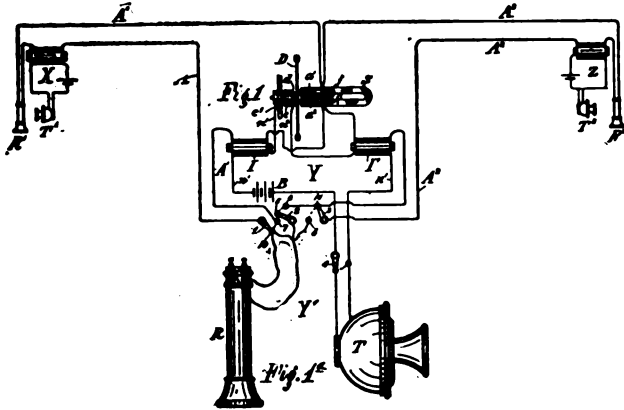


method of applying the same to a telephone pole. The brace consists of a sheet metal thimble *e*. As shown by the section of Fig. 4 there are two edges that are dishd to form longitudinal tubes

which are joined by the flat part *i*. By this means a brace is obtained which is exceedingly light, and at the same time very stiff and economical to manufacture. At each end of the brace the holes *c* and *d* are punched whereby the brace may be bolted to the cross arm and to the poles.

TELEPHONE REPEATER.

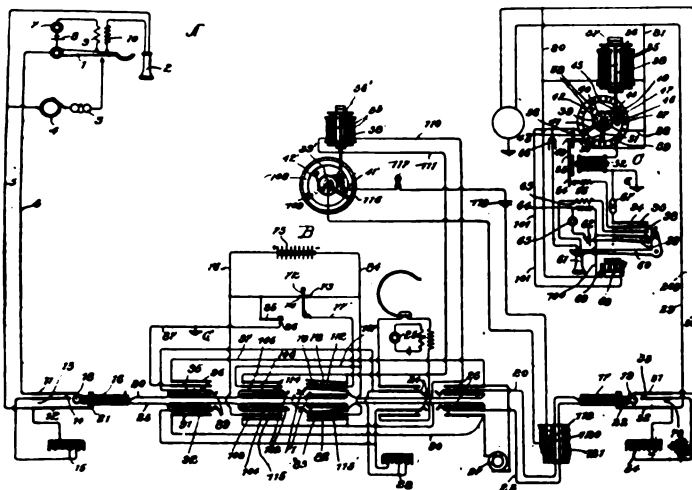
M. Gally, Brooklyn, N. Y., patents (No. 753,252) an improved telephone repeater. It is illustrated in the figure, in which *X* and *Z* represent two ordinary sub-stations connected to a third station *Y* by means of the lines *A*, *A'*, *A2* and *A3*. At the station *Y* the repeater is placed, which consists of a magnet *f* carrying two doubly wound coils *a'* and *a2*. In front of this magnet is



a diaphragm *D* and a microphonic button *d*. One wire of each of the magnet coils is connected with the line *A A'*, while the other to the line *A2 A3*. At the station *Y* there is also a receiver and transmitter and the induction coils *I* and *I'*. Evidently when conversation arrives at the station *Y* over any line it causes the apparatus *S* to operate as a receiver. The vibration of the diaphragm *D* repeats by means of the microphone *d* the impulses to the other lines.

PARTY LINE SYSTEM.

G. Babcock, Chicago, Ill., patents (No. 750,793) an improved party line system and assigns to the Stromberg-Carlson Manufacturing Company. This invention is intended to provide a selective party line lockout system and has already been described in patent No. 157,633. It is a somewhat complicated party line system, diagrammatically shown in the figure, the essential features of which are as follows: At the central office there is a



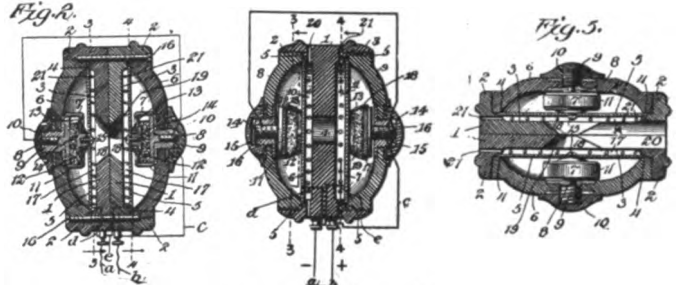
battery *B* and a key *73* whereby currents of either polarity may be sent over the subscriber's line. At the substation there is a polarized electromagnet *35*, which operates a lever *38*, that by means of a ratchet rotates on the disc *57* and contact arm *41*. There are as many contacts in this system as there are subscribers. There is also an electromagnet *52* which releases the disc

at the pleasure of the operator. From this it is evident that by manipulating the key *75* the operator can move the lever *51* and turning the contact around as corresponds to a substation.

TELEPHONE TRANSMITTER.

H. G. Pape, Brooklyn, N. Y., is granted two patents (Nos 752,705 and 752,921), and assigns thirty hundredths of each to James McVey. The object of these two patents is to produce an improved form of telephone and transmitter which may be

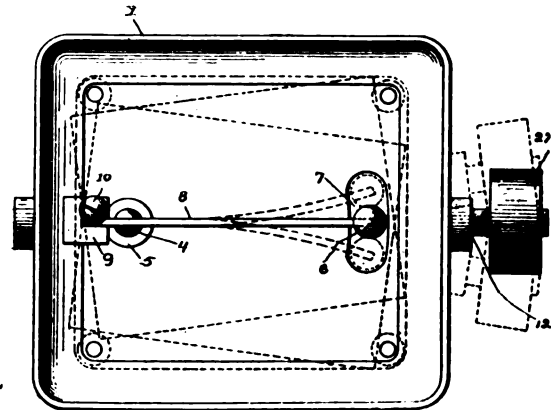
Fig. 2.



employed as a receiver in the device called an audiphone for enabling those who are partially deaf to hear. Both patents are essentially for the same object and differ only in detail. The invention provides a case *1* made in two parts, containing an orifice, *20*, through which the sound waves may reach the interior of the case. There are two diaphragms, *5 5*, which are placed in front of the hole *18* that opens from the orifice *20*. These diaphragms are connected to the microphonic cells *7*, which do not have any essential peculiarities from those of any granular transmitter. As is shown in Fig. 2, these capsules are connected in multiple, and consequently this device falls into the class of the double diaphragm transmitters provided with two buttons.

IMPROVEMENT IN MAGNETO GENERATORS.

Hugh J. Creighton, Anderson, Indiana, patents (No. 751,616) an improvement in magneto generators. The object of this invention is to arrange a magneto generator so that it may be swivelled upon its base in order to adjust its shaft in any desired position. This invention is shown in the figure, in which *1* is the base of the generator, which may be secured to a table or other support.



There is a screw, *6*, at the other end of the yoke, which passes through a slotted hole, *7*, in the base *1*. By this means the direction of the generator and shaft can be slightly adjusted.

RECITED LESSONS OVER TELEPHONE.

C. C. HUFF, an enterprising school teacher in Van Buren township, Grant County, Ind., has used the telephone successfully in teaching absent pupils. For two weeks a family was quarantined on account of smallpox in the family. Two sons of the family were anxious to graduate, and to miss school rendered their examination and standing doubtful. The teacher suggested the telephone, and for two weeks or more Mr. Huff, by means of the telephone, assigned to the absent pupils their lessons, and heard them recite over the telephone in the evening after the regular hours. The boys have returned to school and are well up with their classes, all of which is due to the telephone.



THE WEEK'S MESSAGES

FINANCIAL

LANDESVILLE, IND.—The Landeville Rural Telephone Company has increased its capital stock to \$9,975. Henry Wine is president.

MONROE CITY, IND.—The Wabash Home Telephone Company has increased its capital stock to \$25,000.

HARLAN, IA.—The Harlan and Avoca Telephone Company has increased its capital stock from \$60,000 to \$100,000.

MINNEAPOLIS, MINN.—The Tri-State Telephone Company has declared a three-quarterly dividend at the rate of 6 per cent. per annum.

CARTHAGE, MO.—The Home Telephone Company has filed a trust deed to secure a bond issue of \$25,000.

BERGHOLZ, OHIO.—The Bergholz Telephone Company has increased its capital stock from \$5,000 to \$20,000.

CLEVELAND, O.—The officials of the Federal Telephone Company have decided to list the securities of the United States and Cuyahoga Telephone Companies on the Cleveland Stock Exchange at once.

MASSILLON, O.—The Massillon Telephone Company has increased its capital stock from \$75,000 to \$100,000.

PHILADELPHIA, PA.—The following comparison shows the results of the operations of the two local telephone companies for 1903:

	Bell.	Keystone.
Gross earnings	\$2,446,028	\$481,524
Operating expenses	1,831,330	249,009
	\$614,698	\$232,515
Per cent. operating to gross.....	74.9	51.6
Per cent. net to gross.....	25.1	48.4

ARCADIA, WIS.—The Western Wisconsin Telephone Company, of Arcadia, by John C. Gaveney, president, and Emil Maurer, secretary, has increased its capital stock from \$40,000 to \$50,000.

MONROE, WIS.—The Monroe Telephone Company has increased its capital stock from \$20,000 to \$25,000. W. P. Bragg is president and F. A. Shivers is secretary.

MUSCODA, WIS.—The Muscoda Mutual Telephone Company, by T. E. Nepp, president, and H. J. Homer, secretary, has increased its capital stock from \$1,320 to \$11,000.

FRANCHISES.

HUNTSVILLE, ALA.—An agent for an Independent telephone company is in this city to obtain, if possible, a franchise to operate the Independent exchange.

SANTA ANNA, CAL.—Arthur Wright, for the Home Telephone and Telegraph Company, has filed a petition with the Board of Supervisors to advertise for sale a franchise for the operation of a system on the roads of the county.

CARBONDALE, ILL.—The Board of Highway Commissioners has granted a franchise to the Farmers' League and Community Telephone Company to operate a system on the highways of the township. The city council will be asked for a franchise by the company to enter the city.

CLARINDA, IA.—The Rural Telephone Company has been granted a franchise by vote of ninety-five to five.

EXIRA, IA.—Voters of this place will pass on the application of the Marne and Elkhorn Telephone Company of Roarbeck for a local franchise.

LISBON, IA.—The Lisbon Telephone Company has applied for a franchise at Solon.

FAIR PLAY, MINN.—The Fair Play Telephone Company has been granted a franchise to construct a local system.

ELECTIONS

NEW CASTLE, COL.—The Garfield County Telephone Company, at a meeting held here, elected William Chadwick, president; E. E. Clarkson, vice-president; W. D. Lockard, Secretary; J. A. McRae, treasurer; J. S. Kass, general manager. The line will be extended to Glenwood Springs next summer, and the incorporation of a stock company was authorized.

MCCALL, ILL.—The McCall Telephone Company has elected O. C. Hughes as a director to succeed George Reil. The company also decided to install a new switchboard here and construct a new line to Carthage.

OSCEOLA, IA.—The Crescent Mutual Telephone Company has elected Matthew McCann, president; A. H. Russell, vice-president; George McCann, Secretary, and A. H. Russell, treasurer, all of R. F. D. No. 5, Osceola.

RUDD, IA.—The Farmers' Telephone Company has elected Murray Roberts, president; F. W. Haynes, secretary and treasurer.

RICHMOND, MASS.—The Richmond Telephone Company has elected F. A. Clement, president and general manager; Sidney M. Loveland, vice-

president; C. P. Lovelace, clerk and treasurer. It was voted to authorize the directors to increase the capital stock to the extent of twelve shares.

CAMDEN, O.—The Camden Home Telephone Company has elected the following directors: S. E. Morton, president; J. E. McCord, vice-president; C. E. Morlat, secretary and treasurer. A 3 per cent. semi-annual dividend was declared. The company expects to build new lines in the spring.

CENTERVILLE, PA.—The Home Mutual Telephone Company has elected J. W. Kenney, president; Henry Williams, vice-president; T. B. Theakston, secretary, and Robert Elwood, treasurer.

MISCELLANEOUS

CHAGRIN FALLS, IA.—The Chagrin Falls Telephone Company's exchange was burned at a loss of \$7,000.

WEBSTER CITY, IA.—The E. H. Martin Telephone Company reports that the so-called Hamilton County Independent Telephone Company of this city is not an Independent company at all, having made arrangements to connect with the Bell Company for toll line connections, and one-third of its instruments are to be Bell.

BRAZILTON, KAN.—In a recent issue mention was made of the Brazilton & Girardton Telephone Company. This should have been Brazilton & Girard Telephone Company.

HARTGROVE, OHIO.—The Hartgrove Citizens Farmers Association, operating in the towns of Rome, Hartgrove, Windsor, Trumbull, Harpersfield, Thompson and Armstrong, commenced service on December 20th, 1903. It now has five hundred subscribers with thirty-five miles of lines, served by two exchanges. The company is operated on the mutual plan, each stockholder being entitled to one telephone, and the cost of operating divided pro rata. The Bell Company does not operate an exchange in this territory. The officers of the Hartgrove Company are Robert Marro, president; L. W. Lee, secretary; J. V. Wilson, treasurer; E. W. Hunt, manager, all of Rome, Ohio; John Hathorn, of Rome, and Norman Rice, of Orwell, electricians, and Hart Gladding, of Rome, exchange manager.

PERSONAL

THOMAS H. DALE, for many years manager of the Scranton, Pa., exchange of the Pennsylvania Telephone Company, has resigned. His resignation will take effect April 1. It is understood that Mr. Dale will become identified with a company at Portland, Me. A Mr. Rynal, of Lancaster, will succeed Mr. Dale.

H. H. BRATT, of Chicago, has been made tri-city manager of the Union Electric Telephone & Telegraph Company, of Moline, Ill., and has taken up his new work. Mr. Bratt succeeds Alfred Slater.

W. E. KELLY, of Rockford, Ill., has been installed as manager of the Central Union Telephone Company, in Pekin, succeeding A. P. Glenn, who has been promoted to the Galesburg exchange.

E. J. BURNS, of Rock Island, Ill., has been appointed special agent for the Union Electric Telephone Co., a new office created by the directors recently.

CONSTRUCTION

OAKLAND, CAL.—The Oakland business men who recently visited Los Angeles will endeavor to have the Home Telephone Company of that city construct a system here and also in San Francisco.

STEAMBOAT SPRINGS, COL.—A. G. Mossdam and others have completed arrangements for the installation of a Mutual Rural Telephone line from Deep Creek to Elk River.

MAROA, ILL.—The People's Telephone Company, of Maroa, will extend and improve its lines this spring.

PEKIN, ILL.—The Pekin Telephone Company will construct a branch line south and west of Green Valley.

URBANA, ILL.—Farmers living north of Urbana are considering a proposition to construct a mutual telephone line giving connection with Urbana.

COLUMBUS, IND.—Farmers in the German settlement west of the city will construct a telephone line to connect with the Citizens' Telephone Company here.

DUNKIRK, IND.—The Citizens' Telephone Company, of Dunkirk, will enlarge its switchboard.

MUNCIE, IND.—The Delaware and Madison Counties Telephone Company will construct a local exchange at Daleville.

NEW PALESTINE, IND.—The New Palestine Telephone Company will install a new switchboard and construct a metallic circuit line to the northern part of Shelby County.

SELMA, IND.—The Selma Co-Operative Company has decided to purchase property on which it will construct an exchange, to purchase a new switchboard and otherwise improve its plant and system.

CHARITON, IA.—Several rural telephone companies in this vicinity have organized an association and will construct an exchange here provided they obtain a franchise.

LEHIGH, IA.—The Lehigh Telephone Company will make extensions this spring.

NEW LONDON, IA.—The Henry Car Telephone Company will construct a new exchange building and install a new switchboard.

HOLLYWOOD, KAN.—The Hollywood Telephone Company is constructing a line to Bushtow and will install a switchboard at that place.

STOCKBRIDGE, MICH.—The representatives from ten different farmers' lines met here recently and effected the combination of the several lines. A committee consisting of J. C. Willmore, secretary; A. J. Smith, Fred McCreery, Charles Rose, John Ramsdell, N. M. Townsend, H. G. Gauss and Wirt Barnum, was appointed to purchase a new switchboard and other supplies.

GRENADA, MISS.—A. W. Carter, of Grenada, who operates a long distance telephone line from here to Eupora, will probably install an exchange at Eupora. A franchise has been asked for.

MONROE CITY, MO.—The Monroe Mutual Telephone Company will construct several farmers' lines this spring.

LYNCH, NEB.—The Camp-Dewey Telephone Company is preparing to extend a line to Dorsey.

ARCADIA, OHIO.—The Arcadia Mutual Telephone Company is arranging to build several new lines this spring.

ORWELL, OHIO.—E. E. Howes, manager of the Madison Telephone Company; Dr. Fenton, of Orangeville, and C. W. DeVoe, of Orwell, representing the Jefferson & Warren Telephone Company, held a conference recently to install an exchange at Austinberg.

SALEM, OHIO.—Residents of Salem Township living south and west of Letonia are arranging to construct a telephone line from their farms to connect with the Columbiana County Telephone Company.

INDIANAPOLIS INDEPENDENT COMPANY REORGANIZED

By H. S. O'BRIEN, *Special Correspondent.*

A JUMP of seven points in the price of the stock of the New Telephone Company at Indianapolis last week and of $3\frac{1}{2}$ and 3 points, respectively, for the first and second series of bonds was the first intimation the public had that there was something unusual happening. That something turned out to be the organization of the Indianapolis Telephone Company for the purpose of leasing the wires and carrying on the business of the New Telephone Company. The capitalization of the new company has not been fixed, but will be either \$1,200,000 or \$1,500,000. There will be an issue of \$400,000 common stock and the remainder will be preferred stock paying 6 per cent. The common will pay 3 per cent. Holders of stock in the New Telephone Company will receive an equal amount of stock in the Indianapolis Telephone Company at one-half par value, and preferred stock equal to 25 per cent. of present holdings of New Telephone stock, which will be given as a bonus. The Indianapolis Telephone Company will guarantee the payment of the interest on the bonds and preferred stock of the New Telephone Company during the life of the company's franchise, which has about twenty years to run. This franchise provides that under certain conditions the city may buy the property of the company at the expiration of twenty-five years, or, if the city shall not have bought the property, it may offer the franchise for sale. If the buyers of that franchise shall be other than the New Telephone Company they will be required to buy the tangible property of the company at an appraisal arrived at by the same method provided for reaching the value for the city.

The plan of re-organization was made necessary by the unexpected rapidity of the growth of the company. It has now in Indianapolis about 7,600 telephones and connections, with 1,000 in surrounding towns. Applications are on file for 2,000 additional telephones. The company has been unable to supply these for lack of cables and equipment. At present there are about ninety stockholders of the New Telephone Company, mostly Indianapolis people.

The bonds of the New Telephone Company, \$800,000, the interest on which is guaranteed by the Indianapolis Company, bear 5 per cent., and the \$400,000 of common stock bears dividends of 6 per cent., payment of these also guaranteed. There has never been any preferred stock issued by the New Telephone Company. The par value of the Indianapolis Telephone common stock will be \$100, but holders of common stock of the New Telephone Company will be permitted to subscribe for common stock in the Indianapolis Telephone Company at \$50 per share to the extent of their holdings. Thus, at 50, holders of New Telephone stock will get common stock in the Indianapolis Company on a 6 per cent. basis. By the plan all the common stock in the Indianapolis company will go to the present holders of New Telephone stock, if the issue is \$400,000; also \$100,000, or 1,000 shares, of the preferred stock. If the capitalization of the company be \$1,200,000, this will leave \$700,000 of the preferred stock for the general investing public. The company may issue \$500,000 of the common and \$1,000,000 of the preferred. It is intended to issue at once only \$100,000 of the preferred stock (besides the 1,000 shares which go to holders of stock in the New Telephone

Company). If it be decided to make the capitalization \$1,500,000 common stock to the amount of \$100,000 may be issued at once to be subscribed for by the general public. Dividends on the preferred will be paid semi-annually; the time of paying on the common has not been decided on. The \$100,000 of preferred and the \$100,000 of common (if the common be \$500,000) will be used for the extensive improvements the company will begin as soon as the weather will permit. A second \$100,000 of the preferred stock will be issued when the extensions and improvements are well under way or near completion. The remainder of the stock will be held in the treasury, to be issued from time to time when the company needs additional capital. The extensions proposed will provide for the 2,000 telephones now waiting and for 1,000 additional.

The New Telephone Company was organized and incorporated on January 22, 1898. Its franchise is for twenty-five years and renewable for twenty-five years longer. The officers are S. P. Sherin, president; Louis Hollweg, vice-president; H. B. Sale, secretary and treasurer. They will probably hold the same offices in the Indianapolis Telephone Company.

TELEPHONE TRAGEDIES.

THE telephone is playing a gruesomely important part in the annals of crime these days. Its possibilities were illustrated by a bit of dramatic fiction a few seasons ago, produced on the New York stage, in the course of which a husband, at one end of the telephone line, hears his wife, in their country home miles distant, tell him of the approach of a burglar, and finally hears her screams as she is killed. This seemed altogether fantastic and imaginative beyond the point of likelihood, but a case has just been reported authentically from Louisville, Ky., which in a certain degree reproduces this happening in real life. A man called his wife on the telephone from his office, and while she was talking with him she heard a shot fired, then his voice rose in a shriek, and next she heard his body fall. She ran at once to the office, which was not far distant, and reached it almost as quickly as did the other occupants of the building. Her husband lay dead on the floor, having been shot through a window.

More gruesome even than this tragedy of the wire was that enacted quite recently in a western city. A young man called up a friend on the telephone and told him to hold the wire and he would soon hear something interesting. The friend listened and detected the noise of a quarrel between husband and wife, the woman's screams, the husband's angry words, and finally, after much confusion, incident, as it afterwards appeared, to the overturning of furniture in the fruitless flight of the woman, a pistol shot, a fall, then another shot and another fall. The horror-stricken man at once summoned police aid and the scene of the tragedy was soon reached. The two people lay dead, the husband having first killed his wife and then himself. At Tarrytown, N. Y., lately a woman called up her husband on the telephone and when about to talk with him expired. He heard her fall, and hurried home to find her dead beneath the instrument. While, of course, this case does not fall within the category of the other tragedies of the wire, it has its place with the evidences which are accumulating of the annihilation of space by means of this device.

BOOK NOTICES

Any book herein reviewed will be sent post paid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

GAS ENGINE TROUBLES AND REMEDIES, by Albert Stritmatter. The Gas Engine Publishing Company, Cincinnati. 105 pages, 5 illustrations. Price \$1.00.

With the advent of common battery telephone systems it has become essential to provide some source of power whereby the storage battery employed has a source of energy, which may be constantly replenished. In many companies the gas or gasoline engine is found advantageous for this purpose. The object of the little volume in question is to present a concise account of the method of operation of gas and gasoline engines, and to describe particularly the diseases to which they are subjected and the remedies to be prescribed in each case. The book is divided into ten chapters that respectively treat of fuel supply, the method of starting engines, fuel consumption, ignition, the timing of the engine charge, lubrication and general conditions of the engine. Mr. Stritmatter treats the subject from an exceedingly practical standpoint, and the book is one which will appeal to the wire chief, as it is purely descriptive, unencumbered with formula or mathematics of any description and goes to the root of every day experience in a terse and concise manner.

HENDRICK'S COMMERCIAL REGISTER OF THE UNITED STATES. (For Buyers and Sellers.) Especially devoted to technical industries. The 1903 edition for the year beginning Nov. 1, 1903. Price, \$6.00.

This is a volume of a little over 1,200 pages that essentially comprises a very complete business directory of the United States. It is devoted particularly to architectural, mechanical engineering and similar lines of business. The work is arranged in such a manner as to be exceedingly easy of reference, scheduling both alphabetically by name, under various trades or occupations, and geographically by States and towns. It is a complete annual index of the technical industries, containing over 350,000 names, addresses and business classifications. Full lists are given of manufacturers and dealers in everything employed in the manufacture of material, machinery and apparatus used in the industries. The book is a wonderful compendium of information, names and addresses, and it would seem should be of much value in any office.

THE TELEPHONE INSPECTOR'S HAND BOOK, 51 pages, published by W. H. Hyde, Milwaukee, 18 illustrations, 10th edition, 1904. Price 25 cents.

This is a booklet which is devoted to a concise explanation of the various troubles which originate with telephone apparatus, a method of detecting the trouble and the best remedies to apply. It commences with a tabular statement of the symptoms exhibited by the trouble and the place at which to look for it, and the cause of the difficulty. Subsequently each trouble is taken up in detail and specific instruction given.

TRADE NOTES

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., has just placed upon the market two new subscriber's station protectors for the protection of telephones, one consisting of heat coil and carbons and one of heat coils only.

G. M. GEST, the expert subway contractor, of New York and Cincinnati, has been awarded the contract for the construction of a heavy forty duct conduit system by the Public Service Corporation of New Jersey. This system will run into thousands of dollars in cost and is a main trunk feeder line running through Hoboken and Jersey City. Work is to be begun on the 15th of March and a large force of men to be employed to push the work rapidly.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY has just issued a little pamphlet descriptive of telephonic troubles. In the sixteen pages therein contained ten of the most prominent telephonic troubles are specified, accompanied by a description of the best method of investigating the cause of the trouble and remedying the same. It is a valuable vest-pocket compendium for the troubleman. It will be sent to any one on application to the company.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR TRADE, for good real estate and part cash, a \$45,000.00 telephone property, earning 15 per cent. above running expenses. For particulars, address Box 148 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City, giving description and location of realities. 148

FOR SALE.—100 American Electric, Box Transmitter Telephones (Walnut) in perfect working order; been used but little and absolutely as good as new.—J. W. TOMPKINS, Middletown, N. Y. 146

FOR Sale.—A \$27,000 telephone property earning 24 per cent. above running expenses. For particulars, address Box 147 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 147

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$ AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich. 131

S ALES MEN WANTED.—Reliable men to carry as a side line, an up-to-date line of Advertising Fans, sold to Furniture, Hardware, Drug, Shoe and General Merchants. Convenient to carry. Prompt remittances. GEO. H. JUNG & CO., Cincinnati, O. 139

POSITION WANTED.—By a man with nine years' experience. Good on switchboard instruments or line installations and repairs. Can give excellent references. Address Box 142, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 142

WANTED—TELEPHONE MAN.—Must possess thorough technical knowledge of the business and be experienced in construction and operation. Address W. M. HUBBARD, President of The Zenith City Telephone Company, Duluth, Minn. 141

WANTED.—Position as manager or assistant of telephone exchange of 200 or more subscribers. Over five years' experience in switchboard and construction work. Must be permanent. Address Box No. 86, Wellsburg, W. Va. 149

WANTED.—City Foreman, competent to oversee trouble and light construction system, 2,000 subscribers, Central Energy. Address Box 145, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 145

POSITION WANTED.—Either as lineman or troubleman. Have had 10 years' experience. Best of references. Address CHAS. WARBRITON, 1212 W. Market St., Louisville, Ky. 151


WANTED.—An experienced telephone exchange manager. Must have thorough knowledge of common battery apparatus and be capable of handling an exchange of twelve or fifteen hundred subscribers. Address Box 150, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 150

In spite of the bad weather we flatter ourselves we are doing remarkably well on our Pole shipments.

If you're not satisfied with your present connections, suppose you try us on the next carload. Get our Prices anyway.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Empire Building.**


"From the Stump to the Line"



PITTSBURG & LAKE SUPERIOR IRON CO. **ESCANABA MICHIGAN**

PRODUCERS AND WHOLESALERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building, **CHICAGO, ILL.**

C. J. HUEBEL CO.
MENOMINEE, MICH.

<p>YARDS:</p> <p>MENOMINEE, - MICH. NATHAN, - MICH. STAGER, - MICH. SWANSON, - MICH.</p>	<p>Producers and Wholesalers of</p> <p>IDAHO CEDAR POLES</p> <p><i>48 FEET AND LONGER</i></p> <p>MICHIGAN WHITE CEDAR POLES</p> <p><i>ALL LENGTHS</i></p>	<p>WE HAVE</p> <p>25,000 POLES</p> <p>CONCENTRATED</p> <p>AT OUR</p> <p>MENOMINEE YARD</p>
-------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

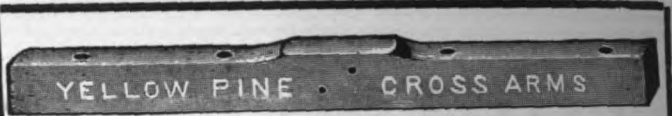
Association de la Presse Techniqe

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.



WE MAKE 'EM

1 AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered any-
where.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	26		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	26 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.

CHATTANOOGA, TENN., U. S. A.

The Valentine-Clark Co.

Be to announce to
users of . . .

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

234 La Salle Street,
Chicago, Ill.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

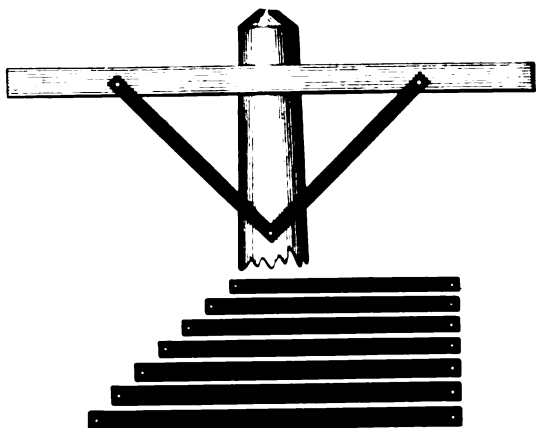
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN JAPANNED GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

IDAHO

MICHIGAN

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Cross-Arms

The Standard Pole & Tie Co.

550 Venezuela Building, New York

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

SPECIAL CROSS ARMS ALL HEART Long Leaf Yellow Pine

We can furnish any quantity promptly. Output 500,000 ft. per month.
Prices low—quality the best. Write us for delivered prices.

Lewis Lumber & Mfg. Co., **R. R. Akers, Mgr.**
HATTIESBURG, MISS.

Tell the Advertiser you saw his announcement in

The American Telephone Journal.

E. CHURCHILL
HERON, MONT.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR
POLES
25 to 80 ft. long.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

Linemen's Outfits
Construction Tools

The Morse
Cedar
Co.
**CEDAR POLES
RAILWAY TIES
POSTS
SHINGLES, Etc.**
Saginaw,
Mich.

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.


**FRANCIS
BEIDLER
& CO.**
459-519 W 22d St.
CHICAGO, ILL.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR " "**
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduct
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

**A Great
Educator**

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

**The American
Telephone Journal**

**116 Nassau Street,
New York City.**

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ♣ ♣ ♣

74 CORTLANDT STREET,

NEW YORK CITY

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.

Main Offices, 551-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,
**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

**WESTON STANDARD
PORTABLE**

DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of energy.

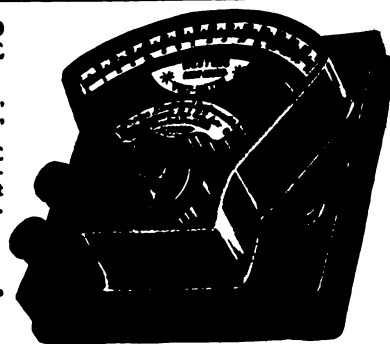
Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers **THE OKONITE CO., Ltd** 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Digitized by Google



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work**Wire Rope and Wire Strand****IRON AND STEEL Special Wire FOR EVERY PURPOSE****THE NATIONAL WIRE CORPORATION****NEW HAVEN, CONN.****SALES OFFICES:****NEW YORK****CHICAGO****BOSTON****DE KALB****KANSAS CITY****NEW HAVEN****SAN FRANCISCO**

American Telephone Practice

By KEMPSTER B. MILLER, M. E.

518 large pages, profusely illustrated with 380
diagrams and cuts of apparatus**\$3.00**

A book for the telephone man. It is an encyclopedia of useful information concerning telephony. It gives complete specifications, enabling you to intelligently order apparatus from manufacturers, and to properly supervise the installation of an exchange, large or small.

It describes in simple language the theory and practice of modern telephony, including circuits, mechanical construction and operation of telephones and switchboards.

A complete description is given of storage batteries, their care and maintenance; of aerial and underground line construction, and, in fact, all the important matters which telephone men need to know.

Sent Prepaid on Receipt of Price by AMERICAN TELEPHONE JOURNAL**ADVERTISERS' DIRECTORY—Continued.****INSULATORS.**

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingway Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.

Churchill, E., Heron, Mont.

Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.

Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Malby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Morse Cedar Co., Saginaw, Mich.
Pacific Coast Lumber Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.

ADVERTISERS' DIRECTORY CONCLUDED ON PAGE 37.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.
39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS



Large Factories in East and West.

Moderate Prices. Prompt Deliveries.

Tell us your requirements and we will submit samples and prices.

C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

**NEW YORK LIFE BUILDING,
KANSAS CITY, MO.**

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

170 Broadway, New York, N. Y.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the WESTERN ELECTRIC COMPANY.

ADVERTISERS' DIRECTORY—Concluded

Sand Point Cedar Co., Sand Point, Idaho.
Standard Pole & Tie Co., N. Y.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

RAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

EALS.

Middleton & Co., J. W., Chicago, Ill.

IGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

OLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

ATIONERY.

Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.

EEL.

Leslie A. C., & Co., Montreal, Can.

OCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.

Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co. Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

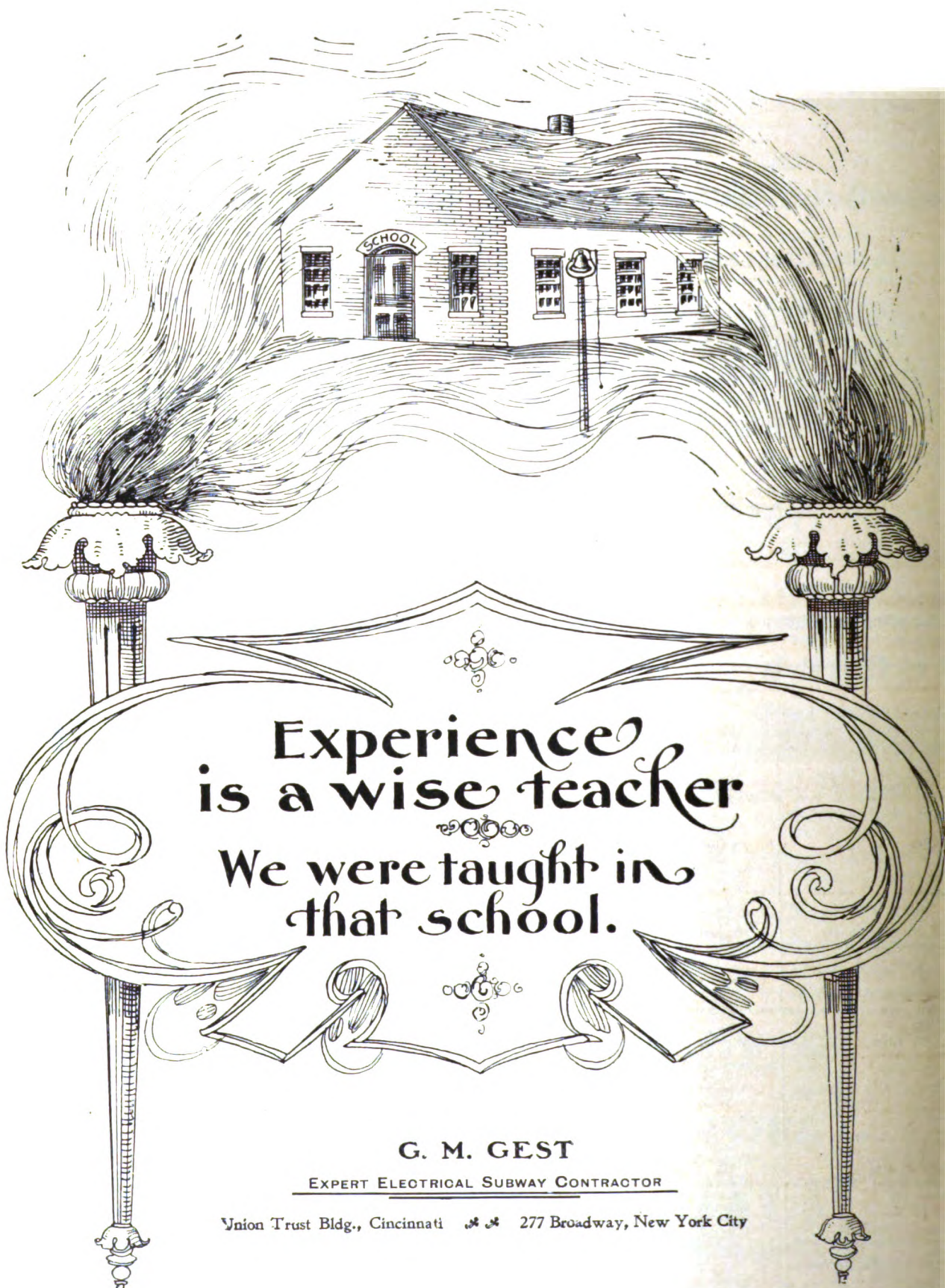
Gildart Bros., Albion, Mich.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebling's Sons Co., John A., Trenton, N. J.
Seovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.



**Experience
is a wise teacher**

**We were taught in
that school.**

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK



LEICH FOUR-PARTY SELECTIVE TELEPHONES

THOUSANDS IN SUCCESSFUL OPERATION

CENTRAL ENERGY OR MAGNETO

No Springs to Adjust—No Relays
—Condensers in Circuit to
Stop the Battery Flow

A Few of the Larger Exchanges
Now Using the System


Mansfield, O.	Youngstown, O.
Massillon, O.	Lima, O.
Trenton, N. J.	Ft. Worth, Tex.
Terre Haute, Ind.	Jackson, Tenn.
Reading, Pa.	Allentown, Pa.
Tampa, Fla.	Brazil, Ind.
Kewanee, Ill.	Springfield, Mo.

ONLY ALTERNATING CURRENTS
USED FOR RINGING

The American
Electric Telephone Company
CHICAGO




THE AMERICAN TELEPHONE JOURNAL



The Editor requests that
special attention be given
the article appearing in
this issue on the sit-
uation in Evansville,
Indiana.

This is an "inside" recital
of facts obtained by a
Special Representative
of The American Tele-
phone Journal.



Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MARCH 19, 1904—CHICAGO Number 12

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

A NOVEL SWITCHBOARD CLEANER.....By J. E. Peavey
PORTABLE STORAGE BATTERY IN A SMALL EXCHANGE.....By E. G. Miller
A BERLIN, GERMANY, TELEPHONE-TELEGRAPH PRINTING SYSTEM.....By Dr. Alfred Gradenwitz
IMPEDANCE AND RETARDATION. Article III.....By Arthur Vaughan Abbott
THE TRUTH ABOUT THE TELEPHONE SITUATION AT EVANSVILLE, IND. IOWA'S INDEPENDENT CONVENTION
AN ENGLISH MUNICIPAL TELEPHONE SET ENGLISH STREET RAILWAY TELEPHONE

The Operating Field:

DES MOINES MUTUAL REFINANCING INDEPENDENT MEETING AT CHILLICOTHE, MO.
FINANCE ESPOUSES INDEPENDENT CAUSE PITTSBURGH AND ALLEGHENY EXTENSIONS
A MISSOURI AND INDIAN TERRITORY ASSOCIATION FORMED ABILENE-TOPEKA TOLL LINE COMPLETED
NEW TELEPHONE COMPANY'S REPORT NEW ENGLAND INDEPENDENT EXTENSION
INSTALLATION OF TELEPHONES AND PROTECTION ON GROUNDED LINES TELEPHONE BILL PASSED IN TENNESSEE
CUYAHOGA'S NEW SWITCHBOARD WORKING TELEPHONE MEETING IN TERRA HAUTE
NORTHERN INDIANA AND SOUTHERN MICHIGAN TOLL LINE ASSOCIATION

QUERIES.

THE EDITOR'S PAGE.

PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 192.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves,
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of our Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

**New Haven
Novelty Machine Co.,**
ELM AND STATE STS.,
NEW HAVEN, CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK**

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

SUCH ARE OUR FACILITIES

that the little as well as the big order has the same careful and immediate attention with the natural result—prompt shipments.

Our stock is the largest in the world and consists of high standard goods, which enable us on the every-day, ordinary shipments to meet the increasing demand for higher standards in construction.

TELEPHONE PARTS

including everything needed for the overhauling and repairing of standard telephones, are carried in Chicago stock, and illustrated and described in our special bulletin No. 21.

We manufacture a complete line of telephones in our own shops, and do not depend upon factories except for the raw material. Our Special Eaco Transmitter is a wonder, and those acquainted with it are the wiser and ahead by many years.

Our Noxem receivers are known from the Atlantic to the Pacific Ocean as the most proper type, with points of excellence which mean reduced maintenance cost to the exchange.

1900 Dry Batteries are still in the lead as the supreme par excellence in telephone batteries, giving a greater average life and of uniform results.

ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET.

CHICAGO

COOK PROTECTORS STANDARD



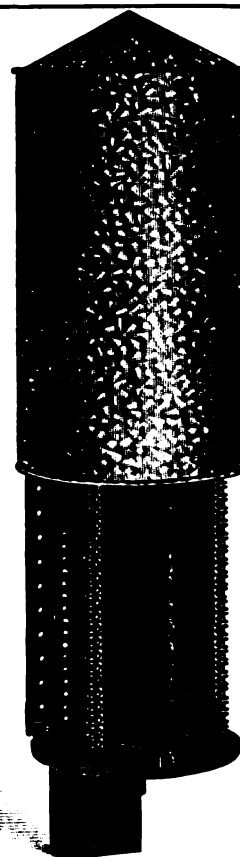
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.

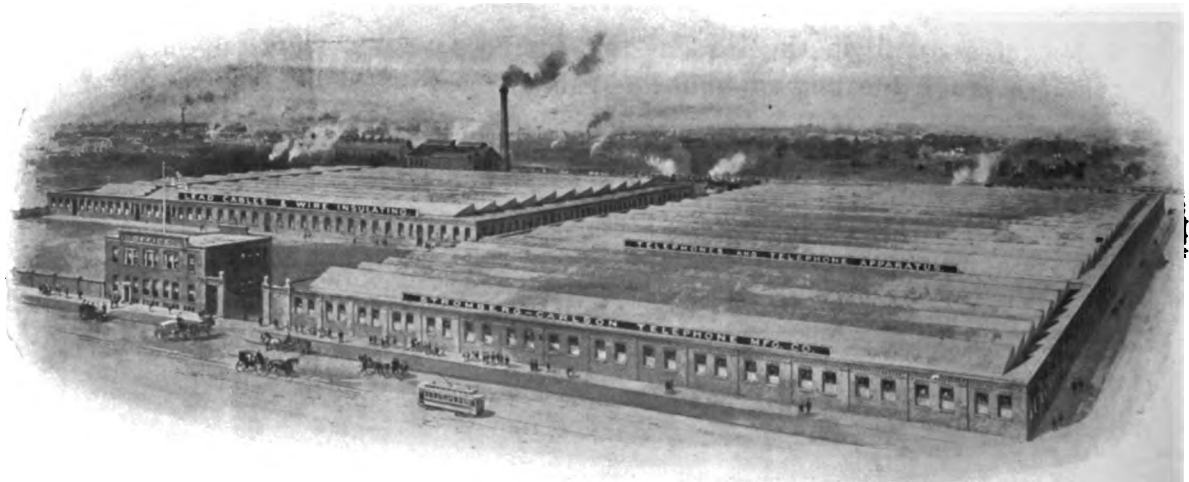


Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

STROMBERG - CARLSON TELEPHONES

Are made TO MAKE MORE SALES

That's why they have built up the largest Independent telephone manufacturing establishment in the world.



OUR ROCHESTER, NEW YORK, FACTORY, 350,000 SQUARE FEET FLOOR SPACE

That means a good deal. It means the highest quality—lowest price consistent with the goods.

We have a new combination switching telephone for rural lines. It does away with knife switches or other cumbersome methods.

ASK FOR BOOKLET 30B

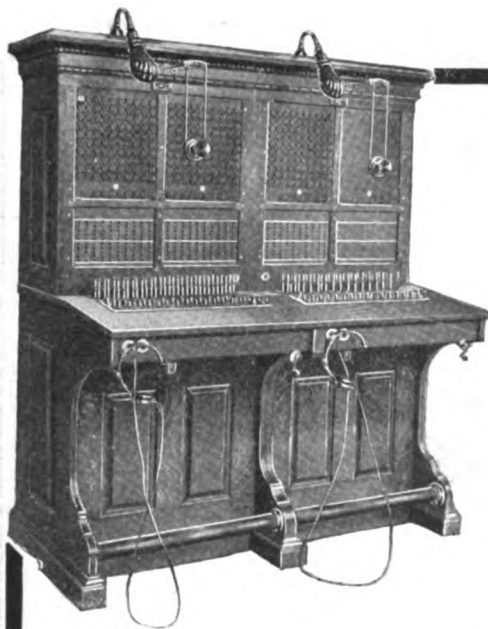
STROMBERG-CARLSON TELEPHONE MFG. CO.

Gen'l & Eastern Sales Office,

ROCHESTER, N. Y.

Sales Dept.,

CHICAGO, ILL.



CN 152

"The memory of quality lasts long after price has been forgotten."

You Cannot Outgrow a

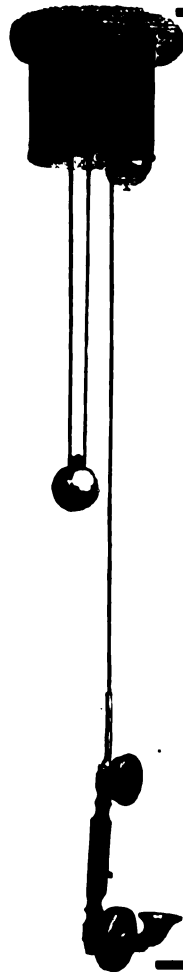
Unit-Type Switchboard

Enlarged as growth demands

For particulars write to

THE NORTH ELECTRIC CO.

156-166 ST. CLAIR STREET, CLEVELAND, OHIO



Down, Up or Sideways!

It never occurred to a telephone manufacturer that the desk set—which so far surpasses the ordinary wall 'phone for most purposes—would so speedily and effectively be improved upon.

WE ARE JUSTLY PROUD OF

The Pendent Telephone

with its almost unlimited capabilities and possibilities; its beauty and efficiency.

It may be raised and lowered at will, carried to any angle, and used at any point.

It interferes with nothing and is always within reach.

TRY ONE AND YOU WILL USE MORE

The Vought-Berger Company

Makers of first-award
Telephones, Switchboards and Appliances
LA CROSSE, WISCONSIN

CENTURY MAGNETO DROPS

For Local and Toll Lines

We Make The Only

They Have No Equal

Genuine Norway Iron

Tubular Magneto Drop On The Market

Investigate Now

CENTURY TELEPHONE CONSTRUCTION CO.

586 Ellicott Square,

BUFFALO, N. Y.

IT'S OUR BUSINESS to convince you that in our new type EXPRESS BOARD



We have reached the acme of

Electrical and Mechanical Perfection

Made in any desired capacity up to 1000 lines

Descriptive matter, sample parts and quotations on request

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



SPRING IS HERE



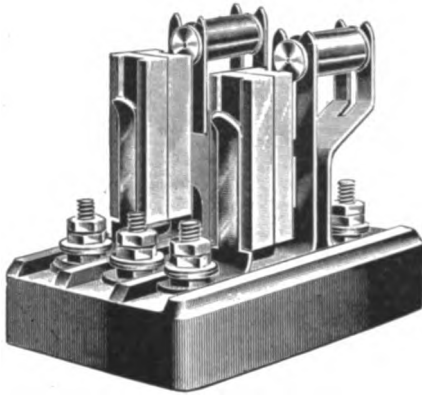
WITH ITS

STORMS

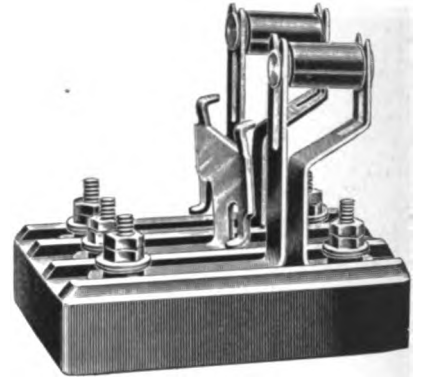
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 251 A.



Something New in a Protector for Telephones.
Order No. 251 B.

WRITE FOR PRICES.

STERLING ELECTRIC CO.



LAFAYETTE, IND.

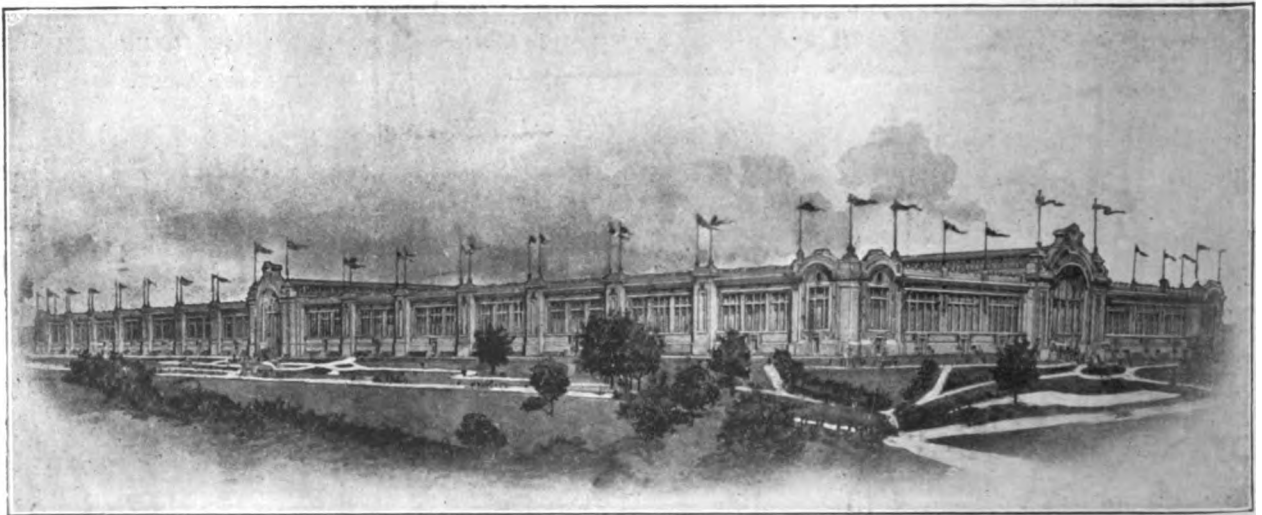


World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

T
E
L
E
P
H
O
N
E

I
N
S
T
R
U
M
E
N
T
S



PALACE OF AGRICULTURE.

T
E
L
E
P
H
O
N
E

S
U
P
P
L
I
E
S

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus
Dealers in "Everything Used with Telephones" 909 Market Street, St. Louis, U.S.A.

The High Character of Kellogg Apparatus

AND THE

Absolute Reliability of the House

**Are making our business
outgrow our buildings,
as a healthy boy
outgrows his clothes.**

**KELLOGG SWITCHBOARD AND
SUPPLY COMPANY** 

Green and Congress Streets, Chicago

**ELECTRIC BUILDING, CLEVELAND.
KEYSTONE TELEPHONE BUILDING, PHILADELPHIA.**



MONARCH COMPACT TYPE TELEPHONES

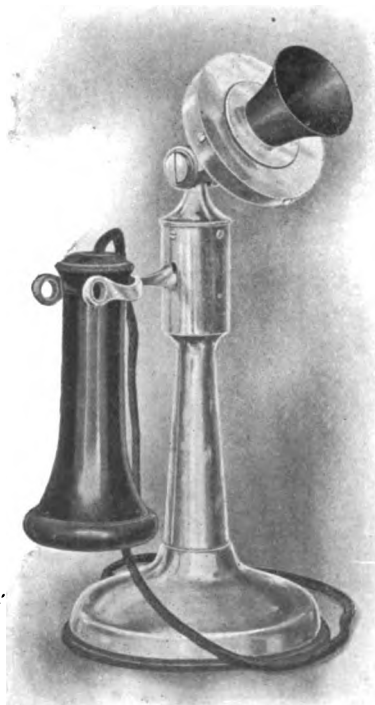
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

The Perfect Desk Set



Perfect Transmission

- " Receiving
- " Switch Con-
tacts
- " Soldered
Connections
- " Nickeling
- " Strength

A Perfect Beauty
for Local or
Common Battery

ADOPT IT
and cut your
maintenance half

The Eastern Telephone Mfg. Co.
West Chester, Pa.

Reliance Transmitter

No. 90



For mounting on woodwork
or adjustable arms



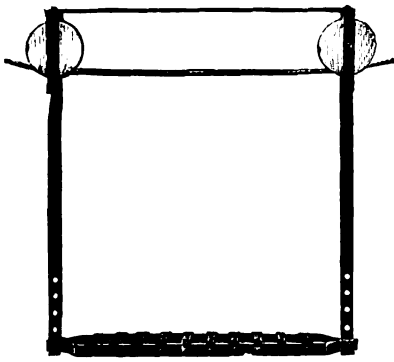
The Button
(actual size)

ORDER ONE TO-DAY
SAMPLE PREPAID

75 Cents.

S. H. COUCH CO.

162 PEARL ST. BOSTON, MASS.

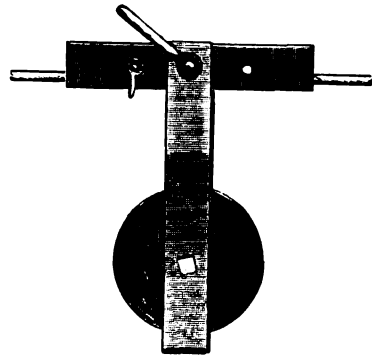
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Dickey Clay Mfg. Co., W. S..... 36	Klein, Mathias, & Sons..... 34	Roebbing's, John A., Sons Co..... 9
American Electric Teleph. Co..... 40	Eastern Telephone Mfg. Co..... 8	Leslie, A. C., & Co..... —	Sand Point Cedar Co..... 30
Am. School of Correspondence..... —	Electric Appliance Co..... 3	Lewis Lumber & Mfg. Co..... 33	Scovill Mfg. Co..... 2
American Vitrified Conduit Co..... 39	Elkin Machine Co..... 33	Lindsley Brothers Co..... 32	Shaw-Walker Co..... —
Automatic Electric Co..... 11	Ericsson Telephone Co..... 10	McIntire, C. Co..... 36	Spargo, James A., Wire Co..... 34
Barr, W. J., Mfg. Co..... 12	Fahnestock Transmitter Co..... 34	Maltby Lumber Co..... 29	Standard Pole & Tie Co..... 32
Beidler, Francis & Co..... 11	Field, C. J..... 36	Michigan Cedar Co..... 33	Standard Underground Cable Co..... —
Bissell Co., The F..... 11	Fowler, John H..... 32	Middleton, J. W., & Co..... 34	Standard Vitrified Conduit Co..... 36
Burnley Battery Co..... 33	Franklin Rolling Mill & Fdy. Co..... 31	Miller Anchor Co..... —	Stanton, L. W..... 34
Butterfield, J. F..... 34	Garton-Daniels Co..... 11	Monarch Telephone Mfg. Co..... 8	Sterling, W. C., & Son..... 33
Camp, The H. B. Co..... 39	Gest, G. M..... 38	Nagel, W. G., Electric Co..... 9	Sterling Electric Co..... 6
Central Mfg. Co..... —	Hemingray Glass Co..... —	National Wire Corporation..... 35	Stromberg-Carlson Telephone Mfg. Co..... 4
Central Telephone & Electric Co..... 6	Holtzer-Cabot Electric Co..... —	New Haven Novelty Machine Co..... 2	Swedish-American Tel. Co..... 12
Century Telephone Const. Co..... 5	Huebel, C. J., & Co..... 29	North Electric Co..... 5	Telephone Printing Co..... 33
Chicago Insulated Wire Co..... 33	Imperial Finance & Cons. Co..... 34	Nungesser Electric Battery Co..... 10	Valentine Clark Co..... 30
Chicago Writing Machine Co..... —	Ingram-Richardson Mfg. Co..... 12	Okonite Company..... 34	Vought-Berger Co..... 5
Churchill, E..... 33	Index of the Technical Press..... 30	Pacific Coast Pole Co..... 30	Wanted, Situations, etc..... 192
Cohn & Bock..... 33	Inland Steel Co..... 32	Pignolet, L. M..... 30	Weston Electrical Instrument Co..... 34
Columbia Electric Co..... —	International Telephone Mfg. Co..... 5	Pittsburg & Lake Superior Iron Co..... 29	Wisconsin Timber & Land Co..... 33
Columbia Mfg. Co..... 33	Kellogg Switchboard & Supply Co..... 7	Pittsburg Sewer Pipe & Conduit Co..... 36	Worcester, C. H., Co..... 29
Connecticut Teleph. & Electric Co..... —	Bissell Co., The F., Toledo, O.	CABLE SLEEVES.	Yesbera Mfg. Co..... 12
Cook, Frank B..... 3	Chicago Insulated Wire Co., Chi-	Nagel, W. G., Electric Co., To-	Cunningham Iron Co., Boston,
Couch, S. H., Co..... 8	cago, Ill.	ledo, O.	Mass.
Crumb, W. H., Co..... 34	Kellogg Switchboard & Supply	New Haven Novelty Machine Co.,	Field, C. J., New York.
Cunningham Iron Co..... 36	Co., Chicago, Ill.	New Haven, Conn.	Gest, G. M., Cincinnati, O.
BATTERIES.	Nagel, W. G., Electric Co., To-	CIRCUIT CLOSERS.	Nagel, W. G., Electric Co., To-
Burnley Battery Co., Painesville,	ledo, O.	Garton-Daniels Co., Keokuk, Ia.	ledo, O.
Ohio.	National Wire Corporation, New	CARD INDEX SYSTEMS.	Pittsburg Sewer Pipe & Conduit
Electric Appliance Co., Chicago,	Haven, Conn.	Shaw-Walker Co., Muskegon,	Co., Pittsburg, Kan.
Ill.	Okonite Co., New York.	Mich.	Standard Vitrified Conduit Co.,
Nungesser Electric Battery Co.,	Roebbing's Sons Co., John A.,	CLIMBERS.	New York.
Cleveland, O.	Trenton, N. J.	Klein & Sons, Mathias, Chicago,	W. S. Dickey Clay Mfg. Co.,
Stromberg-Carlson Tel. Mfg. Co.,	Standard Underground Cable Co.,	Ill.	Kansas City, Mo.
Chicago, Ill.	Pittsburg, Pa.	Nagel, W. G., Electric Co., To-	CONNECTORS.
BONDS.	Stromberg-Carlson Tel. Mfg. Co.,	ledo, O.	Cook, Frank B., Chicago, Ill.
J. W. Middleton & Co., Chicago,	Chicago, Ill.	CONDUITS.	McIntire Co., C., Newark, N. J.
Ill.	CABLE HANGERS.	American Conduit Co., Chicago,	Nagel, W. G., Electric Co., To-
BRASS.	Bissell Co., The F., Toledo, O.	Ill.	ledo, O.
Scovill Mfg. Co., Chicago, Ill.	Cook, Frank B., Chicago, Ill.	American Vitrified Conduit Co.,	CONSTRUCTION SUPPLIES.
BOOTHES.	Nagel, W. G., Electric Co., To-	New York.	American Electric Tel. Co., Chi-
Yesbera Mfg. Co., Toledo, O.	ledo, O.	Camp Co., The H. B. New York.	cago, Ill.
CABLES.	Standard Underground Cable Co.,		Electric Appliance Co., Chicago,
American Electric Tel. Co., Chi-	Pittsburg, Pa.		Ill.
cago, Ill.			

WANT AND FOR SALE ADVERTISEMENTS, PAGE 192.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 19.

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.

TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

New Common Battery Wall Set



Unique and symmetrical in design.

Perfect in construction of the working parts, durable and cheaply maintained.

All parts are easily accessible for inspection or repairs.

**Send Today
for Catalog.**

Ericsson Telephone Co.

"INDEPENDENT."

Manufacturers and Importers of Switchboards, Telephones, and Telephone Supplies for Magneto and Common Battery.

296 Broadway,

New York.

ADVERTISERS' DIRECTORY—Continued.

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

PILES.

Shaw-Walker Co., Muskegon, Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

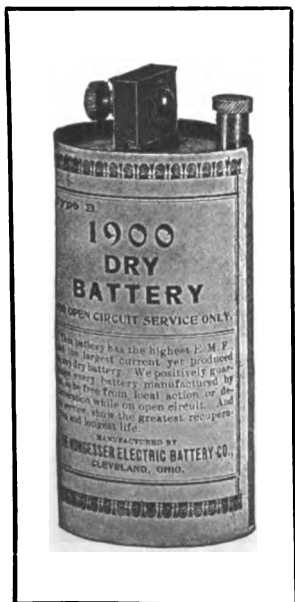
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 11.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

SPECIFY THE

"1900"

The Manufacturers Stand Behind the Quality of the Goods

THE NUNGESESSER ELECTRIC BATTERY CO.

8000 Automatic Telephones

...for...

Columbus, Ohio.

The Citizens' Telephone Company of that city will at once erect a new exchange building and discard the manual equipment of the central energy type which it is now operating. The order given us for 7000 stations has been increased to 8000.

Don't buy a new switchboard until you have personally inspected an Automatic Exchange.

...Manufactured by the...

AUTOMATIC ELECTRIC COMPANY

CHICAGO, U. S. A.

ADVERTISERS' DIRECTORY—Continued

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Lealie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Huebel, C. J., Co., Menominee, Mich.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Standard Pole & Tie Co., N. Y.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONCLUDED ON PAGE 37.

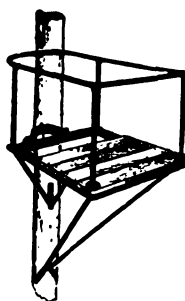
STOP TROUBLE

THE G.-D. DROP

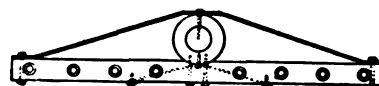
THE only Telephone Extension circuit closer that has no magnets. Operated by bell clapper. Can't burn out. Nothing to get out of order. Not connected with telephone wiring. Simple. Durable. Cheap.

Send for special sample offer.
: : Ask for Pamphlet D6 : :

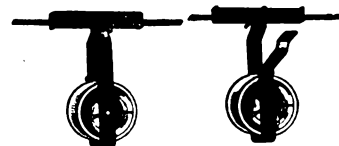
GARTON-DANIELS CO., Keokuk, Iowa



POLE PLATFORM
With Railing - \$7.25
Without Railing, \$4.25

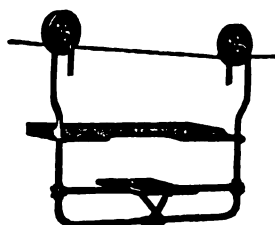


DOUBLE ARMING BRACES



CABLE TROLLEYS, \$1.80 each.

Send for Bulletin 233.



CABLE CARS
Without Table, \$7.50
Add for Table, \$2.50



PANELS



POLE SEATS, \$3.00
Pole Ladders, \$4.00

THE F. BISSELL COMPANY
TOLEDO, O.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK



"Hercules"

Positively the strongest
and most durable bridger
on the market.

100,000

IN DAILY USE

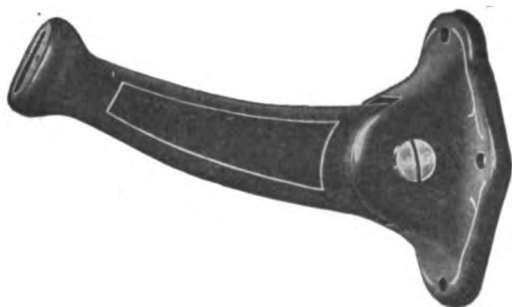
BECAUSE

*They are superior to others.
Give better service.
Cost less to maintain.
Ask us for catalogues and
prices.*

Swedish-American Tel. Co.
CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



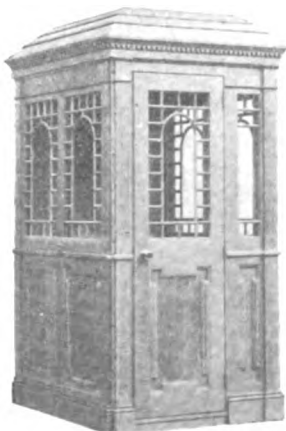
Good Signs

**BRING THE NICKELS
AND DIMES**

Our enameled iron telephone signs pay for them-
selves every day
They are a dividend paying investment and should
be freely used by every exchange

Designs and prices free on request

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

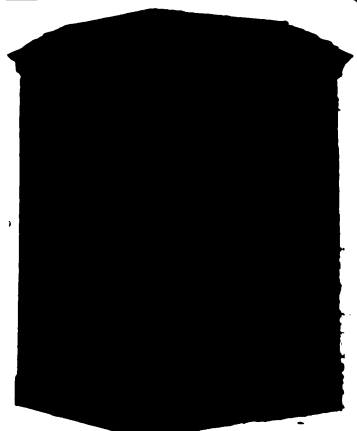


Booths Bring Business

Absolutely essential to long distance talk,
and greatly appreciated for their privacy
by pay station users. They will increase
largely the income from any public telephone.
The *all right booths* are made by

YESBERA MFG. CO.
TOLEDO :: :: :: OHIO

Catalogue on Request.



The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MARCH 19, 1904

NUMBER 12

A NOVEL SWITCHBOARD CLEANER

By J. E. PEAVEY.

IN maintaining a telephone switchboard and its appurtenances, there is no element so productive of faults and trouble as the natural accumulation of dust, dirt and corrosion. Every precaution is taken by telephone companies to exclude as much as possible dust and suspended matter in the air from the operating and apparatus rooms, but it is impossible to keep them entirely free of such accumulation, and the same rule of cleanliness is godliness applies to inanimate as well as animate things, particularly so in the telephone exchange, where there is a veritable labyrinth of inaccessible wires, delicate connections, apparatus, nooks and corners to catch and store dust, and by such accumulation producing low insulation, corrosion, loose connections, leakage and cross-talk, also facilitating wear on moving and working parts of the equipment.

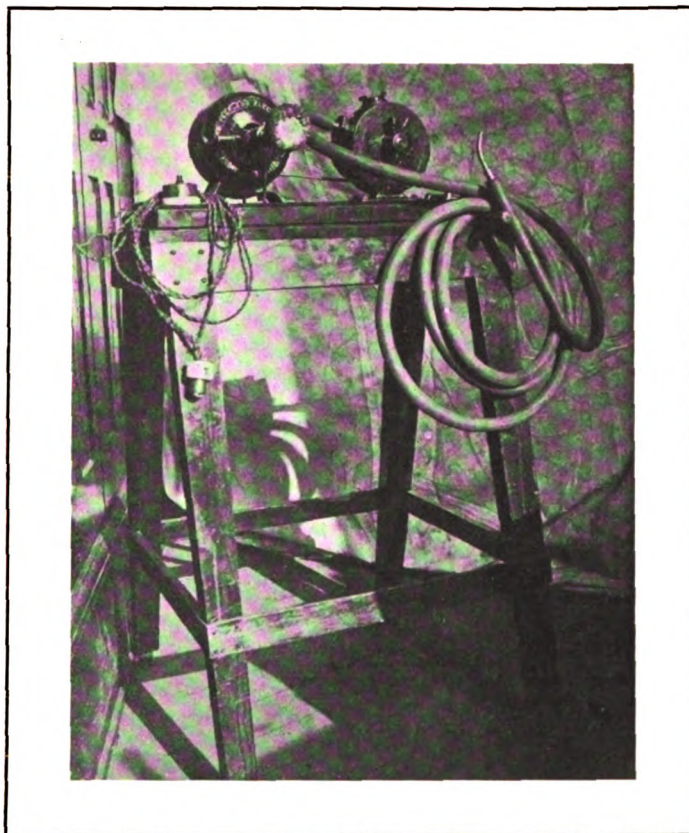
Another source of trouble is due to the operators lifting plugs from the sockets in the keyboard by their tips. By this means their bare fingers come in contact with the metal and leave an oily deposit, which in time is sufficient to break contact with the spring jacks. The customary way of cleaning is by hand, using a hand bellows or air pump for blowing out the dust where it cannot be removed with a feather duster and wiping the plugs by hand with a polishing cloth, which, of course, is a very slow, expensive and tedious process. To enable exchange equipment to receive a thorough, systematic and economical cleaning, the writer designed and put into service the apparatus shown in the above illustration, which consists of a $\frac{1}{4}$ H. P. motor, belted to a small air blower, the blower having attached about 20 feet of rubber hose, with nozzle. One end of the motor shaft is extended and carries a buffer for cleaning the plugs, the whole being mounted, as shown, upon a wooden horse or pedestal, which is on rollers and can easily be moved around the room by the operator. There is an extension cord and plug for making connection for the electric motor direct in any of the regular lamp sockets along the switchboard or room fixtures, it not being necessary to do any extra wiring whatever. With this apparatus one man can accomplish in a day more than two or three men in as many days.

To the wire chief the old series board was a perpetual source of annoyance, and the number of cases of trouble increased very nearly in proportion to the number of subscribers which were connected. The jacks in the multiples were arranged one after the other in series, and the slightest particle of dust and grit deposited in the jack would leave the line open and cut off the subscriber. There was no remedy for detecting this difficulty, for the central office was unconscious of any effort of the subscriber to signal. When the subscriber's patience, after fruitless grinding of the magneto, became exhausted, the only resource was to go to the telephone of the nearest friend and call up central and report the trouble. Naturally complaints of this kind were accompanied by an opinion of the telephone plant vouched by the subscriber, the vehemence of which entirely transcended the conversational rules of the telephone company.

To overcome this most serious objection to the series multiple board the bridging board was designed, and while this invention did overcome the difficulty with the jacks so far as open lines were concerned, it has by no means rid the switchboard from the troubles which arise from the inevitable accumulation of dust. There are still hun-

dreds of contacts in the key jacks which offer a lodgment for dust and which open the subscriber's lines and often seriously interfere with delivery of the best form of service. The devising of methods of cleaning switchboard apparatus has racked the brains of manufacturers. Curious spoon-shaped tools have been tried which may be poked into the jack holes and the dust scraped out. Thin steel springs inserted in a wooden handle have been inserted between the springs of the jacks in the hope of clearing the difficulty. All sorts of patent fluid nostrums have been advocated for washing off the jacks and relay points, but so far, experience has shown that the remedies offered by this device have been worse than the diseases they were intended to cure. And the more the switchboard is doctored with such patent medicines the more decrepid it becomes.

Of all methods so far devised that which involves the use of a blower capable of producing a strong current of clear air which



Switchboard Cleaning Apparatus Consisting of an Electric Motor (on the Shaft of which is Mounted a Buffer), Which Drives a Small Blower Furnishing an Air Blast.

may be directed against the springs of the jacks, is perhaps the most beneficial, the simplest to manipulate and the least detrimental to the subsequent life of the switchboard. The motor is started causing the fan to deliver a strong air blast; then the nozzle is inserted into jack after jack and the blast allowed to impinge upon the springs for a few seconds. This is usually sufficient to clean out all of the dust. In the same manner the

key springs can be gone over; in fact, from all parts of the board otherwise inaccessible the dust may be removed. In the largest exchanges it is customary to organize a regular cleansing gang and to go over the switchboard every night. By this means a high degree of cleanliness is secured and maintained with a consequent prolongation of the switchboards and a like reduction in the complaints of subscribers.

THE TRUTH ABOUT THE TELEPHONE SITUATION AT EVANSVILLE, IND.

THE telephone situation in Evansville, Ind., is not so complex as has been reported. The facts are as follows: The new Independent Company has the law of the land on its side. Legally, the Cumberland Telephone and Telegraph (Bell) Company has no existence in Evansville.

When the Cumberland two months ago found there was no longer relief for it in the courts it made a new proposition. This was, briefly, that the city council cancel all existing telephone franchises (since the Cumberland Company had none to cancel) and sell the right to an exclusive telephone business in Evansville to the highest bidder. Manifestly this would be a death blow to Independent companies since the Cumberland company already had its plant installed in the city and could, therefore, afford to bid twice or even three times as much for the franchise as could any Independent competitors.

The editorial columns of the city newspapers were bought and largely used in advertising this proposition; small fortunes were paid for even a quarter column favorable comment from the editor. When it became apparent, however, that the business men would not hear to any such a drastic scheme and such an injustice to the municipal company, which held a legal charter, the Cumberland company started another crusade. Since the law and the city council were against it the Cumberland company determined to turn to public sentiment to uphold it in its fight.

The methods used in this attempt to win public opinion to the Cumberland's side do credit to the bright and wideawake advertising agents of the *Evansville Journal* and *Courier*. Again, it shows to what length and to what depth of perfidy the Cumberland company will go to win its point. As one merchant expressed himself, "If there was a telephone war on in heaven the Cumberland company would bribe the angelic choir to chant the praises of the trust system."

Having decided to make the last desperate effort, the general superintendent of the Cumberland company was called in to arrange with the newspaper agents. The Cumberland company was very cautious about this move. It wished to run its big daily advertisements in as reading matter and news and make it appear to the citizens of Evansville that the views advocated in the articles were the real sentiment and policy of the newspapers.

Arrangements were perfected with the two leading dailies whereby the Cumberland company was to have prominent space for its advertisements. It was to be allowed not more than three columns in a single issue, the price to be 20 cents per line of six words. Headlines were to be two columns wide in 24-point type. In fact, everything possible to fool the reader as to the truth of the game being played was arranged for. A special reporter was detailed who should do nothing else except to seek interviews favorable to the Cumberland company from the business men.

This has been the programme for the past five weeks. All the wholesale men were interviewed and testified at length as to the great value of the Cumberland company's long-distance lines. Their view was that if the Cumberland company was ousted from Evansville that the wholesale men would lose thousands of dollars through not being in ready touch with out-of-town customers. To read their statements, without knowing the real status of affairs, one would come to the conclusion that there was not a single town of any consequence near Evansville where an Independent company was installed. It did appear that a real injustice would be

done to Evansville business houses if they had to tear their long distance lines out.

These wholesale men were interviewed once and sometimes twice, and even their traveling salesmen granted interviews. The thing was kept up until the enterprising reporters were about out of material for new articles. Then they went to dealing in generalities, rehashing old interviews and quoting even life insurance agents, who never were known to use a long-distance telephone, in order to get something to fill up valuable space.

The big retail merchants, who really control the city's trade, and who, it would seem, would be most interested in the city's progress, were approached by the reporters. What they whispered in the reporters' ear, though, was never published. And well it was not, for if ever the Cumberland company got its just deserts in a talk it got it from those merchants. To a man they upheld the Independent company, and they stand so to-day.

The cost of the Cumberland company's advertising is enormous. Their advertising bill from the two dailies for the month of February was over \$11,500.

Public sentiment was somewhat affected by the newspaper advertising, but to no great extent. Most of the people saw through the scheme. One stockholder in the Municipal company got excited and wanted to call a meeting of all stockholders and see if the company did not need a receiver appointed. A meeting was held, the *AMERICAN TELEPHONE JOURNAL*'s correspondent attending, and the company's affairs discussed. Everything was shown to be on a sound basis. The reason for not going ahead with the installation of the plant at once was explained by the fact that the officers and directors will wait until the legal battle is forever settled and the field is clear. The stockholder went away satisfied.

On March 7, the chief of police stopped the Cumberland company from erecting new poles or otherwise extending its lines in the city.

March 8, the *AMERICAN TELEPHONE JOURNAL*'s correspondent interviewed one of the wholesale men who recently was quoted as favorable to the Cumberland company. He was shown statistics to the effect that the Cumberland company has no connections with 70 per cent. of the telephone users in Indiana; that for every telephone operated by the Cumberland company the Independents in the State operate six. A map was presented to him showing that Evansville is surrounded with a perfect network of Independent companies' lines, and that every town of any size has Independent long-distance connection with St. Louis, Terre Haute, Indianapolis, Richmond, Louisville, Owensboro, Lexington, Memphis and Paducah. He was further shown that there are five long-distance Independent lines seeking entrance to Evansville, and are ready to connect at any moment with the new Municipal company.

"Why, good God," he exclaimed, when shown this array of figures, "I can get to more people by Independent lines than by the Cumberland system if this is true." He was invited to investigate conditions for himself, and stated emphatically that he intended to do so.

On Wednesday, March 9, the *Journal News*, the evening daily, refused to further publish any articles for the Cumberland company. It recognized that the friendship of the merchants back of the Municipal company, which it was attacking, was worth more than the money for advertising from the Cumberland company.

Further, it came out in big first-page headlines with an article repudiating the trust's methods, which it denounced as brow-beating and misinforming. It stated the Independent company's side of the fight, declared it to be to the city's best interest, and

created a big sensation. To use one man's words, who had carefully studied the telephone situation and knew well whereof he spoke: "The *Journal* printed the headlines to the Cumberland company's death notice so far as Evansville is concerned."

IOWA'S INDEPENDENT CONVENTION

THE eighth annual convention of the Iowa Telephone Association was held at the Savery Hotel, Des Moines, March 8, 9 and 10. Over one hundred delegates were in attendance and upwards of twenty-five manufacturers and supply houses were represented, and made elaborate displays of their materials and apparatus. The opening session of the convention was held Tuesday evening in the club room, the meeting being called to order by President Henry S. Herr. President Herr, in his opening remarks, referred to the death during the past year of Mr. H. C. Rainey, of Fairfield, Iowa, a former president of the association. Upon his suggestion a committee was appointed to draft suitable resolutions, to be reported to the convention later.

The report of the Secretary and Treasurer, Mr. Charles C. Deering, was then presented, showing a gratifying increase in the membership and a satisfactory condition of the treasury.

President Herr's address was then read, an abstract of which follows:

"This annual meeting of the Iowa Telephone Association should be one of the most interesting sessions since its organization. Never before in the history of Independent telephony was there a greater need of wise counsel than at the present time. It is no prophecy to say that we are approaching a crisis which must be met with sober thought and sound judgment. Independent telephony has passed the sentimental period and is entering a new era, in which service and dividends are the principal factors. It is a business governed by business principles, therefore let our deliberations be unprejudiced and unselfish.

"The association has been a great and permanent good to the companies of the State. By the interchange of experience we have learned many things relative to construction, operation and maintenance of telephone systems, that we could not have learned so easily in any other way. The mutual encouragement has been helpful and will continue to be as long as the association is wisely conducted in the interest of all.

"Net profits cannot be considered before a depreciation fund is set aside. When that is done and the plant is paying 8 per cent. dividends, the investment can be considered 'gilt edged.' Notwithstanding the past, the Independent telephone business has come to stay. And while it came like a whirlwind, it will not go like the falling of a tree. If there is danger, it lies in this: that we may be too independent,—by too much divided, too many small companies. There is just about as much danger in this as there is in companies too large. Too many small companies require the time of too many persons to care for the business. There is not sufficient revenue for each small company to employ the necessary skilled workmen and all-around manager. When companies are too large, the boards of trustees and managers cannot keep in close enough touch with the work and employees.

"The telephone proposition is, in a measure, a repetition of the formative stage in steam railways and telegraph companies, and of electric roads. The railroads were built and equipped by smaller companies, and, from want of true business principles and uniform methods, became losing propositions and sold out for debt and combined in greater systems, and by shrewd management were placed upon a paying basis. It was the same with the telegraph companies, the original companies at times losing all they invested.

"The electric lines in many places are experiencing the same thing to-day, with this exception: That many are profiting by the experience of the older transportation companies and are merging with other companies so as to cheapen operation and increase revenue before it becomes necessary to pass into other hands.

"It is necessary to devise some way by which the many companies can be managed by practical men. One practical and skilled man can as easily manage a limited number of small exchanges as one. And it is better to

pay one man a fair price and have good results, than to pay a dozen less competent and have poor results.

"The New Jersey Interstate Telephone Company, the United Telephone and Telegraph Company, the Cumberland Valley Telephone Company, the Consolidated Telephone Companies of Pennsylvania, all of Eastern Pennsylvania, New Jersey and Maryland have been organized by combining nearly two hundred smaller companies and have traffic arrangements, and control and operate nearly three thousand miles of toll lines, giving satisfaction and paying dividends, and splendidly maintaining their plants. One writer says, 'We learned the importance of combining by districts to meet competition, and for that purpose we combined. We found it a dividend paying proposition.' The Interstate Independent Telephone Company of Illinois has assured its stability by combining, and is earning dividends and making its securities better.

"I have seen several articles on organizing on a mutual plan; whereby representatives of several companies, in districts, should meet and select representatives to another or higher body, who should make rules or regulations governing all companies. I believe it well to tie everything up in corporate papers and tie them up so that none can transfer interest to our common competitors.

"The secret of success for the Independent telephone companies lies in combination and co-operation. Difficulties are continually coming up in the way of successfully operating the adjoining telephone companies. The matter of division of territory is a serious question in some localities where the paralleling of lines and the crossing into territory claimed by other companies cannot be avoided. From past experiences, I have little faith in any method short of actual combination and merging, in districts, under one general management.

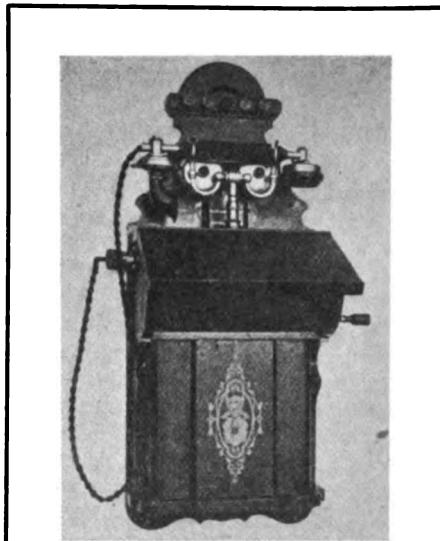
"The merging of companies in districts will not interfere with any practical clearance house proposition or Independent toll line connections, but rather make it easier and more satisfactory, since one contract with such merged companies will represent the district.

"In many places the Independent telephone companies are joining interests by selling their holdings to a new company. They give better service; they are controlled and operated by one general management; local difficulties are entirely cut out; the checking of business is easily done. All expenses are paid from one fund and all companies share alike according to their interest in the new company. All have a common interest and work to build up the system and make it a success. All are stockholders in one company and the stock is of more value than when all is

separated. If extensions are necessary, it is easy to procure funds by bond or loan. Whereas, on the other hand, when all are separate, no funds can be purchased by any one, without additional collateral, or only such small amounts that it would be of little value. The better companies, in districts, would not borrow and invest their credit to help their neighbors unless substantial security is forthcoming to protect them against loss. But where all are combined, all will share alike in raising money and in the improvements.

"The State is too large to be operated by any one company, there being over twelve hundred small exchanges. Therefore, I advocate organizations by districts. Let the Home Telephone Company of Des Moines, and the companies controlling the several lines and exchanges in the counties adjoining, unite their interest on a common basis and place all under a competent general superintendent and a board of trustees elected from the different companies. Back them with your moral support, and your property will be safe and success assured.

"The Independent can never realize the real value of his property as long as every small company seeks to control the entire field and arbitrarily make rules for his neighbor and for his own selfish purpose regardless of the general good. The best way to accomplish this result and to combine our interest, is for the companies in certain territories to organize a stock company, each subscribing for a number of shares equal in value to the possible value of your plant. Then have the company (stock) thus organized appoint appraisers who, together with the owners of the separate companies, shall appraise the property of each company. Then let the newly organized company purchase the holdings of all the companies, paying for them with



ENGLISH MUNICIPAL TELEPHONE SET.

The illustration is from a photograph of a subscriber's telephone equipment such as is used in England by some of the municipal companies there. Compared with the compact American sub-station instrument it appears particularly cumbersome and bulky. The set shown is magneto. The batteries are contained in the lower part of the box, while the generator is in the center section. It will be noticed that the magneto hand telephone is the prevailing type in that country.

stock of the new company to the amount of the appraised value, and then you have your object accomplished. Each company will hold its interest in the new company, and all will be under one general management which will represent all the companies combined.

"This will do away with territorial disputes, and it will be easy for the new companies to arrange for through toll line service, to extend new long-distance copper line wherever they may be needed, to contract for the service over such lines as are now built,—in all of which the small company will share in the larger company proportionate to the amount they have invested.

"No clearance house proposition that may be inaugurated or toll contract will add to the market value of your property as a combination by corporate papers can do. The clearance house managers can have no practical control of the several companies clearing through it. They may *suggest*, but cannot *do*. Some one may say, by contract you can compel. Compel means law-suit. All law-suits not only take money but they are a guarantee of poor service."

Senator John T. Brooks, Hon. Justin R. Doran and Hon. J. R. Shaffer, members of the General Assembly, were called on for speeches and responded briefly. Senator Brooks reminded the members that the Legislature was in session and that if they had any requests to make that he would use his best endeavors to have them granted. He called attention to a bill just passed by the Senate requiring farmers to trim the trees along the roads, so that the limbs would not extend more than four feet into the highway. This action will be of considerable benefit to the telephone companies.

Mr. P. C. Holdoegel, of Rockwell City, then addressed the convention on the subject of "Long Distance Lines." He dwelt with emphasis upon the need of long distance copper lines in order to handle the business successfully in competition with the Bell company. He suggested three plans for obtaining them: By combination of various companies in a district for the purpose of building lines; by the organization of long distance companies, the stock of which could profitably be owned by local companies; or by each company covering its pole lines with a copper circuit. In the latter case there would be the objections of lack of uniformity of construction and equipments and also a lack of centralized control. Mr. Holdoegel favored the consolidation plan, his only fear being that the local interests might be overlooked by lack of close supervision.

The session closed with a general discussion on the "Farm Line Proposition." It developed that there was wide divergence of opinion as to rates and construction. No action, however, was taken toward bringing about uniformity at the present time.

WEDNESDAY'S SESSION.

At the Wednesday morning session Mr. H. E. Ralston, of Maitland, Mo., addressed the convention on the subject of "Jealousy Among Telephone Men." He strongly urged the necessity of getting acquainted with all the details of the business and, hand and hand, finding out the mistakes that had been made, and going about correcting them in a business-like way. At the present time all telephone men are experimenters and have to learn. Instead of trying to head off a man who has a new plan or scheme, it should be studied, and if merit is found in it, it should be endorsed.

After a general discussion of the paper addresses were read by Mr. J. C. Thorne, of Fairfield, on "Operating a Telephone Plant as a Side Line;" Mr. Paul H. Patton of Waterloo, on "Our Business Relations," and Mr. H. A. Kinney, of Woodbine, on "Our Loyalty to the Principles of the Association."

Mr. Kinney said in part:

"Upon hearing the results of the battle of Bunker Hill and learning with what bravery our ancestors faced the British, then considered as almost invincible, Washington is said to have declared that the liberties of the country were safe. Their intrepidity in battle, their willingness to endure hardships, their continued adherence to their country's cause through eight years of strife demonstrated the truth of Washington's declaration.

"In view of this and other facts in our own national history, it should not be necessary to come before this body of intelligent business men and plead for greater loyalty to the principles of this association. It ought not to be necessary, but unfortunately is. With so many telephone companies unrepresented, with so little co-operation among those represented and less among those that are not, with the increasing demand for telephones and the increasing necessity for capital, we ought not to be obliged to discuss loyalty to the principles of the association.

"The population of Iowa is reaching the two and one-half million point. When the point of saturation is reached there will be in active service at the lowest calculation two hundred and fifty thousand telephones, at a valuation of from ten to fifteen millions of dollars, with a gross annual income running into the millions. The realization of these figures does not depend upon this association. It does not depend upon us individually. If this association should never have another meeting—if we should all go out of the telephone business to-morrow, it would come just the same. It is possible for the people to have service at a cost within their reach and they are going to have it.

"It remains for the Independents' endeavor alone to complete the task already begun, and in order to do it successfully we must work as a unit. To do this we must put an end to the miserable bickering and petty quarrels among ourselves. We must make an organized effort to establish toll lines to cover the territory successfully and still not squander capital. We must work together in attempting to get the smaller, weaker and inexperienced companies to adopt better business methods, better construction and to give better service. And this should be so whether they are members of the association or not. We need a campaign of education rather than of exclusion. We must work together in assisting each other in getting into forbidden ground."

Mr. Patton advocated a centralization of control but no consolidation. He suggested the Ohio plan, which provides for a state organization of congress with two branches. In the upper branch each company has but one vote, while in the lower each company has votes in proportion to the value of its plant. The measures for control originate in the upper house, but must be ratified by both before they are binding on the organization. This body has the power to fix rates for charges for regular service, for tolls, for the use of wires by bucket shops, commission houses, etc., and to dictate the terms upon which franchises shall be taken, and to pro rata toll charges between toll companies and originating or terminal exchanges.

In the discussion which followed the reading of the papers there developed considerable sentiment in favor of centralization of management and ultimate consolidation by counties or districts, as advocated by President Herr in his opening address. Objection to immediate consolidation was based for the most part on the ground that it will take time to develop the worth of certain properties, and to eliminate companies that are now competing with each other, and at the same time opposing the Bell company. It was almost the unanimous opinion that the first step should be the establishment of a clearing house, and that after a couple of years' experience with this the owners of exchanges would be in far better position to talk consolidation and to arrange for it on an intelligent basis and with some degree of comprehension of the relative values of exchanges and toll lines.

A special session of the convention was held on Wednesday afternoon, at which papers were read by Mr. J. M. Plaister, of Fort Dodge, on the subject, "Shall We Establish a Clearing House," and by Mr. D. M. Griswold, of Des Moines, on "The Necessity of Uniformity in Toll Line Service and Rates."

Mr. Plaister presented the advantages of the proposed system over the present arrangement whereby every company must maintain a checking clerk and an expensive system of settlements with all other companies individually. The new plan would facilitate these settlements effectively in much the same manner as the system adopted by all city banks has simplified their relations. Mr. Plaister strongly urged that some action be taken toward the establishment of a Clearing House, and requested the association to either take the matter up itself or to give its approval to any plan which might be decided on by the companies most interested.

Mr. Harry B. Brookings of Minneapolis, Minn., who was present, upon request described in detail to the convention the methods of operation of the Clearing House in Southern Minnesota and the benefits which have been derived from it.

After extended discussion it was suggested that a roll of companies represented be called in order to determine the general sentiment on the clearing house proposition. Seventeen responded "Aye," and one "Nay," many companies not voting. It was then decided that those companies which were interested in the proposition should get together and formulate a traffic agreement of some nature. A committee, consisting of Mr. E. H. Martin, of Webster City, Mr. J. M. Plaister, of Fort Dodge, and Mr. W. D. Dunsmore, of Oskaloosa, was appointed to formulate a definite plan to be acted upon on the following day.

Upon the motion of Mr. George M. Bandy, of Des Moines, a committee consisting of D. M. Griswold, of Des Moines, E. H. Martin, of Webster City, and P. C. Holdoegel, of Rockwell City, was appointed to make report on Thursday morning as to the advisability of changing the present method of division of tolls to the mileage basis.

Mr. S. S. Lichty, chairman of the Committee on Resolutions, presented a resolution expressing the regret of the association for the death of Mr. H. C. Rainey, and extending sympathy to the members of the bereaved family. President Herr spoke with feeling upon his personal relations with Mr. Rainey, characterizing him as a man of sterling worth and as an exceptional man among men.

Mr. J. S. Bellamy referred to the recent order of the Postmaster General excluding Independent telephones from many of the post offices, and believed that the association should take some action in regard to the matter. A general discussion ensued, and the sense of the meeting was expressed in the following resolutions, which were presented by Mr. Plaister:

WHEREAS, The Postmaster-General has issued instructions that but one telephone system shall be used in the post offices of the United States and that system must be the one having long distance connection with Washington, D. C., and

WHEREAS, The Bell Company being the only one permitted in the District of Columbia, then this order of the Postmaster-General is obviously issued in the interest of the Bell Company, this fact being made all the more evident owing to the long connection of the Postmaster-General with the Bell Company both as an official and as a stockholder, and

WHEREAS, The subscribers of the Independent telephone companies outnumber those of the Bell Company by more than 600,000, these people owing to the instructions of the Postmaster-General being deprived of their just rights and privileges, and these instructions being the more flagrant and outrageous when it is known that in hundreds of cities, towns and districts no business could be transacted through telephones with postoffices by government officials or residents except over lines of Independent telephone companies, both local and long distance, therefore be it

Resolved, That the Iowa Independent Telephone Association in convention assembled, hereby condemns in unmeasured terms these instructions of the Postmaster-General and vigorously protests against any government official using his official position for the advancement of the interests of such a gigantic and unscrupulous monopoly as the Bell company, and

Resolved, That the officers of this association are hereby directed to take immediate steps to co-operate with other Independent telephone associations and to use such other means as they may deem proper, to cause these pernicious instructions to be rescinded, to secure equal rights and privileges to be granted to Independent telephone companies and to cause a public statement to be made by the Post Office Department in which will be set forth the future attitude of this department toward the Independent telephone companies.

In the evening the delegates, with their wives and friends, sat down to an elaborate dinner as guests of the local committee.

U. S. Alderman, of Nevada, presided as toastmaster. Governor Cummins extended official greetings to the Association in a graceful speech, and complimented the Independent men on the strength of their movement in the State. Lafe Young followed in response to the toast "A Long-Distance Hot Wire." He was in his happiest vein, and completely captured his audience by his eloquence. After a short musical programme Mr. A. L. Urick, president of the Trades and Labor Assembly, spoke on "Relations of Employees and Employers." The last response was by Hon. Edmund Nichols, of Perry, to the toast "Service." He did full justice to the subject, and was given a merited ovation.

MANUFACTURERS REPRESENTED.

Automatic Electric Co., Chicago; H. S. Durant.
Swedish-American Telephone Co., Chicago; E. B. Overshiner, R. L. Scott,
F. M. Ferguson.

Monarch Telephone Mfg. Co., Chicago; W. H. Trimm, A. J. Carter.
Western Telephone Mfg. Co., Chicago; J. E. Keelyn.
Stromberg Carlson Telephone Mfg. Co., Chicago; Wm. Bowen, Fred Moltzauer, H. A. Jones.

Electric Appliance Co., Chicago; S. A. Dinsmore, Leon Bly.
Valentine-Clark Lumber Co., Chicago; F. L. McGillen.
American Electric Telephone Co., Chicago; P. J. Eubanks, W. R. Hauptman, H. P. Blackledge.

Eureka Electric Co., Chicago; I. J. Kusel.
Illinois Electric Co., Chicago; N. G. Harvey, M. McNeill.
J. A. Roebbling's Sons Co., Chicago; W. J. Crawford.
Chicago Writing Machine Co., Chicago; F. W. Pardee.

Sterling Electric Co., Lafayette, Ind.; W. E. Doolittle, Fred Freers.

Vought-Berger Company, La Crosse, Wis.;
Geo. H. Pierce, M. I. Berger, G. O. Lundgren.
Modern Electric Co., Burlington, Ia.; D. C. Bell.

Page & Hill, Minneapolis, Minn.; J. E. Dodds,
of the Dodds Lumber Co.

Wittenberg Cedar Co., Wittenberg, Wis.; W. S. Arnold.

Ewing-Merkle Electric Co., St. Louis; W. S. Taussig.

Miller Anchor Co., Norwalk, O.; G. H. Miller.
North Electric Co., Cleveland, O.; F. F. Sapp.
C. J. Huebel & Co., Menominee, Mich.
Standard Underground Cable Co., Chicago.

THURSDAY'S SESSION.

At the opening of the Thursday morning session Mr. Bellamy outlined the bill recently introduced before Congress by Congressman Fairbanks, of Indiana, providing that letters marked "Open and read by telephone" shall be opened by the postmaster and read over the telephone to the addressee, and that a small fee shall be enclosed to defray the extra expense. He called attention to the effect of Postmaster General Payne's order upon the Independent telephone companies in this matter.

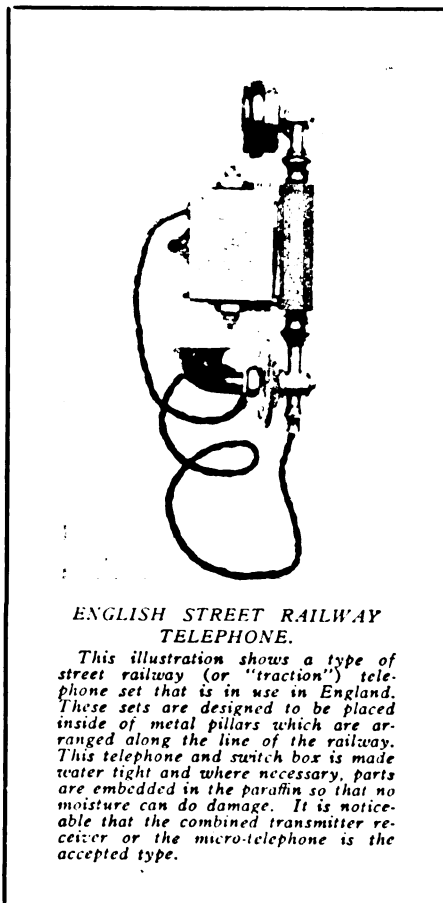
E. H. Martin, of Webster City, chairman of the committee on arrangement for a clearing house for the toll service of the Independents, reported on the plan for establishment of the association, and the report was adopted by unanimous vote, every company represented approving, and by its representative signifying its intention of becoming a member of the association.

The report provides for the incorporation of a stock company with a capitalization of \$10,000 to be known as the Central Telephone Traffic Association, in which no company is to hold to exceed one share of stock. The headquarters are to be in Des Moines, and the business is to be in charge of a salaried auditor. The association is to devise a uniform checking system to be used by all lines in the association which is to show the point of originating, the lines traveled and the distance traveled over the lines of each company, the terminal charges made and the arbitrary charges.

The association is to deduct one cent for expense of clearings for every message handled, is to deduct the terminal and originating charges, arbitrary charges, etc., and credit them to the companies entitled to them, and is to then divide the balance of the business in proportion to the mileage traveled.

A supplementary resolution adopted determines what the charges shall be. The originating company is to be credited with 25 per cent. of the toll charged, provided this amount does not exceed 15 cents for a single message. The balance is to be divided between the companies whose lines are used in proportion to the mileage used in transmission of the message and the distance is to be determined by an air line from the point where a company receives the message to the point where it is delivered to the recipient or to another company. The charges for messenger service, etc., are not to be reckoned in the apportionment of tolls.

The following officers were elected for the ensuing year:



ENGLISH STREET RAILWAY TELEPHONE.

This illustration shows a type of street railway (or "traction") telephone set that is in use in England. These sets are designed to be placed inside of metal pillars which are arranged along the line of the railway. This telephone and switch box is made water tight and where necessary, parts are embedded in the paraffin so that no moisture can do damage. It is noticeable that the combined transmitter-receiver or the micro-telephone is the accepted type.

John C. Sullivan, Creston, President.

Stanley S. Lichty, Vinton, Vice-President.

Charles C. Deering, Des Moines, Secretary and Treasurer.

The members of the Committee on Formation of the Clearing Association are: E. H. Martin, Webster City; J. M. Plaister, Fort Dodge; W. D. Dunsmore, Oskaloosa.

The members of the Executive Committee, aside from the offi-

cers, are: J. S. Bellamy, Knoxville; U. S. Alderman, Nevada; J. C. Thorne, Fairfield; R. C. Holdoegel, Rockwell City.

The Legislative Committee consists of Messrs. Bellamy and Alderman and George Bandy, of Des Moines.

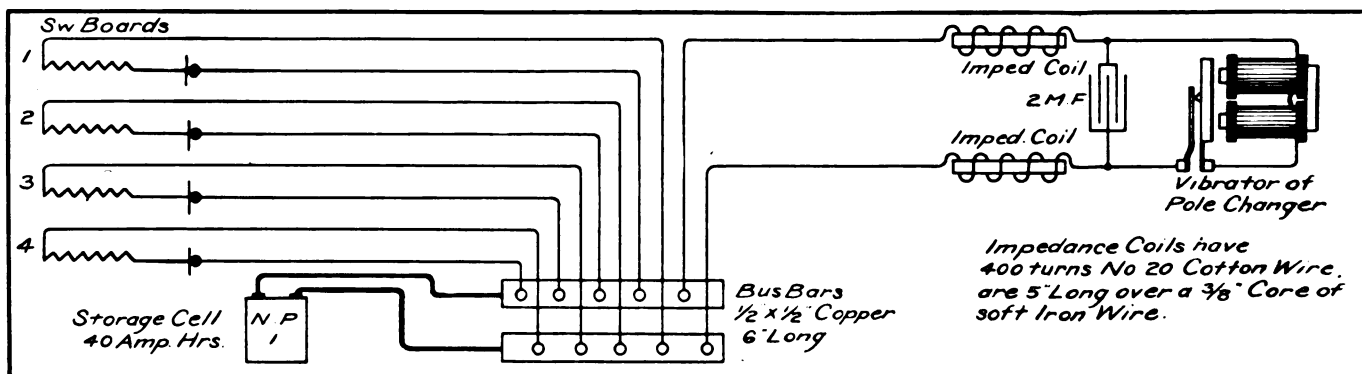
A vote of thanks was returned to the local committee for the banquet of Wednesday evening and the entertainment afforded the visitors.

PORTABLE STORAGE BATTERY IN A SMALL EXCHANGE.

BY E. G. MILLER.

OUR company has a 400-line exchange six miles from its main office in a town where there is no day lighting circuit. A pole changer is used to supply ringing current. The ordinary closed circuit cell only lasted five or six months, and when it

vibrator of the pole charger. There is no noise in the operators' sets and no cross-talk. The storage cell is charged every three or four days at the main office of our company where there is charging current available. We use a portable type *American U. P. 1-40*



Circuit Showing Wiring of Operator's Transmitter Circuits and Pole Changer Which Are All Supplied With Current from the Same Storage Battery.

did give out it did so at the worst possible time. By using the portable storage battery a great deal of dirty battery work has been done away with and better service furnished for both the pole changer and for the switchboard transmitters. A storage battery has been installed from which all four of the operators' transmitter circuits are taken, and it also supplies current to drive the

Ampere Hour cell, and of course have two, one being used while the other is being charged.

The exchange troubleman charges them, and we find that it costs us less by this method than to use four-gravity cells for each transmitter and an Edison-Leland on the pole charger. The service is also better and more reliable.

A BERLIN, GERMANY, TELEPHONE-TELEGRAPH PRINTING SYSTEM.

BY DR. ALFRED GRADENWITZ.

THE typeprinting telegraph service just installed in Berlin is intended to afford a useful complement to existing telegraph and telephone systems. In telephonic communication, there is a possibility of mistaking the spoken words and the absence of an acknowledgment in writing of the transmissions, such as is frequently required for business purposes; on the other hand, conversations may be overheard by a third. A similar interception of a despatch is possible also in the case of the Morse telegraph. The new device will obviate this. The new system can with some simple modifications be easily adapted to work in conjunction with existing telephone circuits.

The "Teletype" (Ferndrucker), as constructed by the Siemens & Halske Company, belongs to the class of typeprinting telegraphs, from which it is, however, distinguished by the extreme simplicity of its working. The knack of operating the apparatus may be acquired by anybody in a short time, the teletyper being nothing else than a tele-typewriter.

The type wheel is provided on its periphery with two circles of types, corresponding with the letters and figures and signs of punctuation respectively, the type wheel being adjusted to either

of the circles by means of a shift key. The printing takes place simultaneously in both the sending and receiving apparatus, no matter whether there is or is not somebody operating the latter.

The central exchange just opened in Berlin is intended to insure mutual communication between any two subscribers to the new system, as well as a simultaneous transmission of special dispatches, such as exchange telegrams, from one sending station to any desired number of subscribers. The apparatus is likely to be useful also in the case of the person rung up being absent, as the telegram, being printed on his receiving apparatus, will be found on his return. The working of the exchange is quite similar to that of a telephone exchange. There is a switchboard, including indicators and jacks for 100 subscribers. As soon as the subscriber strikes the calling key of his apparatus, the official in charge of the switchboard at the central station is advised by the indicator of the subscriber in question dropping and a bell being rung, when the official will put himself in communication with the caller, ask him for the desired connection and connect the two subscribers, so that their respective apparatus are immediately ready for mutual communication.

IMPEDANCE AND RETARDATION—ARTICLE III.

BY ARTHUR VAUGHAN ABBOTT.

IN previous papers the subjects of retardation and capacity were treated and their effects on the flow of alternating currents were described in a general way. Now it is proposed to treat the subjects in a more specific manner and make calculations involving these qualities in the way that would be done in actual practice. It will be remembered that *reactance* is the name given to the retarding effect due alone to a counter electromotive force developed in a circuit in which an alternating current flows. In other words, *Reactance is Counter Electromotive Force*. Counter or back electromotive force in a circuit will decrease current flow in the same way that resistance would, therefore the effect of re-

for a well-designed retardation coil. Under these circumstances the properties of the coil would be as follows:

$$L = .025$$

$$N = 100$$

$$2\pi = 6.28$$

$$\omega = 500$$

$$\text{Reactance} = 6.28 \times 100 \times .025 \times 500 = 7812 \text{ ohms.}$$

Now the reactance is so enormously in excess of the ohmic resistance that the latter plays a very small part in determining the impedance of the coil. To be strictly accurate the impedance should be found as previously described—namely, by adding together geometrically the ohmic resistance and reactance. In this case the diagram would be inconveniently large and it is possible to ac-

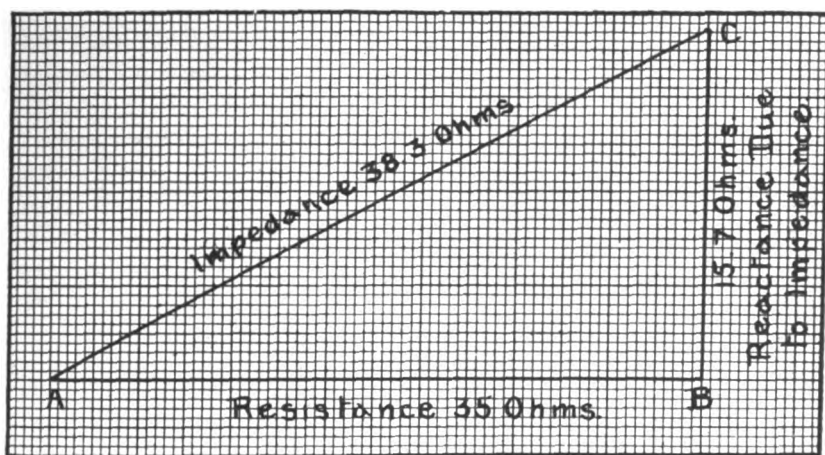


Fig. 6. Calculation of Impedance Due to Inductance.

actance (or counter electromotive force) may be measured in ohms.

In the last article it was found that the reactance of a certain coil was 15.7 ohms. When its resistance was measured with a Wheatstone bridge it was found to be 35 ohms. Now we wish to find the *Impedance*, or true opposition, due to both the reactance and resistance it will offer to an alternating current. The impedance is calculated as follows. Take a sheet of cross-section paper. Draw the line *AB*, Fig. 6, to any desirable scale, say 1" = 10 ohms, and make it equal to 35 ohms. Draw the line *BC* perpendicularly to *AB* at *B*, and make that to the same scale equal to 15.7 ohms. Join the points *A* and *C*. Then the line *AC* measured by the same scale will give the true opposition, or as it is usually denominated, the resistance of the coil to an *alternating* current, which in this case is found to be 38.3 ohms. If the reactance and the resistance had been added together arithmetically we should have obtained 50.7 ohms, which is considerably too large. The quantity which is represented by the line *AC* is termed the *Impedance* of the coil.

In an earlier paper it was shown that the amount of current which flows through any circuit is determined by Ohm's law,

$$C = \frac{E}{R},$$

but it has now been indicated that this law will not hold

true with alternating currents, particularly when those of high frequency are involved, because the opposition which a circuit offers is not merely that of an ohmic resistance but includes the effect of reactance. If, however, we substitute for *R* the impedance of the circuit which may be conveniently symbolized by *I*, Ohm's equation is still found to give correct results, so that when

$$\text{an alternating current is concerned we must write } C = \frac{E}{I}.$$

Suppose in the preceding example that the coil had been provided with an iron core and so surrounded with iron, and that the value of μ , or permeability factor, became 500, a low amount

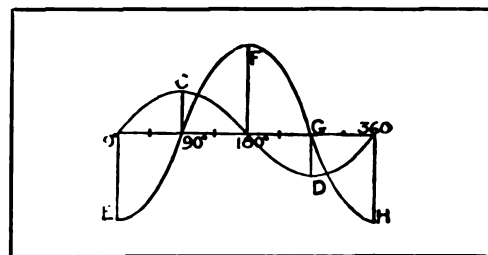


Fig. 7. Relation of Current and Electromotive Force.

comply the same result arithmetically. We may square the reactance and square the resistance, add the two together arithmetically and extract the square root, which will give exactly the same result as that obtained by the geometric method

$$\text{Impedance} = \sqrt{35^2 + 7812^2} = \sqrt{1225 + 61027744} = \sqrt{61028969} = 7813 \text{ ohms.}$$

In Fig. 7 suppose line *EF* to represent the electromotive force in an alternating current circuit in which there is no sensible inductance, such as a piece of straight wire. Under these circumstances the current, which may be also represented by the line *EF*, will exactly follow the electromotive force, and will reach its maximum and minimum points at the same time. Suppose that in this circuit a coil of wire containing iron be inserted, it has been shown that such a piece of apparatus operates to delay the current and prevent it from reaching its maximum value as soon as it would occur if the coil were absent. The result of the insertion of such a coil is to cause the current wave to be displaced behind the electromotive force wave in some such manner as is represented by the line *OC* in Fig. 7.; then the current is said to be a *lagging* current, and the amount of lag is measured by the angle which is included between any point of electromotive force wave and a corresponding point of the current wave.

The calculation of the angle of lag can be accomplished by the same diagram previously used to obtain impedance by adding together geometrically the ohmic resistance and the reactance. Refer to Fig. 6. The angle *CAB* included between the ohmic resistance represented by the line *AB* and the impedance represented by the line *AC* is the angle that measures the amount that the current is behind the electromotive force. The same result can be obtained by dividing the reactance by the resistance. The quotient is the *tangent* of the angle between the electromotive force and current, and the number of degrees may be found by referring to any table of natural trigonometrical function or to Table 2. This relation is expressed as follows:

$$\text{Tangent of angle of lag} = \frac{2\pi N L}{R}$$

(To be continued.)



EVANSVILLE BELL METHODS.

ON another page of this issue THE AMERICAN TELEPHONE JOURNAL is able to give a review of the telephone situation at Evansville, Indiana, where the Cumberland Telephone and Telegraph Company has been making a desperate fight for existence. The disclosures show to what length the Bell companies will go to gain their point.

We have indicated from time to time that the public press is not always to be relied upon in telephonic matters, but the statement referred to reveals a depth of perfidy and a persistence in deceit which is really astonishing. The insidious molding of a favorable public opinion, which is a sure foundation for success, by clever and timely paragraphs, has long been a favorite business method with the Bell companies. Its press agent is an important wheel in the great Bell monopolistic machine. But here was not a situation which called for the insertion of an occasional news item, containing a "picturesque adaptation of the truth." The condition necessitated the immediate and wholesale manufacture of public opinion through the editorial columns.

There is no need of going into the ethics and morals of this transaction as far as it concerns the press of Evansville. Eleven thousand dollars a month, judiciously distributed, will accomplish much, even with the supposedly great and reliable metropolitan dailies. It is perhaps asking too much of human nature to expect country editors to refuse the use of their columns at double the ordinary advertising rates. For twenty cents a line Satan himself might be able to secure favorable mention in the suburban dailies of the New Jerusalem, if there are any such.

The trouble with the scheme lies in the impossibility of cornering truth for any great length of time. After realizing a small fortune from the sale of its editorial columns to the Bell concern, one publisher experienced a sudden attack of ingrowing conscience superinduced by the demands of the local retail merchants, and the truth at once came out with large headlines.

Readers of the article in question will be impressed with two things: the desperation of the Bell Company, indicating a death struggle, and the ignorance of wide awake and usually intelligent wholesale merchants, which shows that the Bell people are correct in the emphasis which they place on the right kind of publicity.

It appears that in such an enterprising little city as Evansville these wholesale merchants, during a newspaper campaign lasting five weeks or more, were made to believe that if the Cumberland Company were ousted from the city they would lose thousands of dollars because of inability to get into telephonic communication with their out-of-town customers. These wholesale merchants actually worked against their own interests and to fasten a monopoly about their necks. They remained in blissful ignorance of the facts that five Independent long distance lines were seeking entrance into Evansville and that by the use of Independent lines they could reach more out-of-town people than by Bell lines, until a correspondent of THE AMERICAN TELEPHONE

SOME INDIANA TOLL COMPARISONS.

JOURNAL opened their eyes to the truth. The ignorance of laymen regarding these matters is, perhaps, not altogether surprising when we consider that the Independent movement has been

progressing with such rapidity that even telephone men have difficulty in keeping abreast of the times.

Take by way of illustration the advance sheets of Rate and Route Book No. 2, now in preparation for the New Long Distance Telephone Company, of Indianapolis (Independent), and compare the figures with those in the last issue of the American Telephone and Telegraph Company (Bell). The comparative statement will astonish even telephone men if they have not been to special pains to keep posted on this marvelous development.

The New Long Distance Company reaches a total of 1,444 offices in Indiana alone; the Bell companies a total of 622 offices. Of these, there are 423 offices common to both companies, while 971 are reached by the Independent company and not by the Bell. In other words, two and one-half times as many offices and stations in the State of Indiana can be reached over Independent lines as over the wires of the American Telephone Company and the two Bell licensee companies operating in the State.

It is not easy to realize that it is now possible to talk over Independent lines from Lexington and Louisville, Kentucky, to Indianapolis, to St. Louis and Kansas City. The New Long Distance Company, of Indianapolis, not only gives service to more than 107,000 Independent telephones within the State of Indiana, but also throughout Kentucky, Illinois and to points in Missouri, Michigan and Ohio. It will be only a matter of a few weeks until a subscriber of an Independent telephone in Kansas City will be able to talk to Pittsburg, Pennsylvania, entirely over Independent lines. In fact, as an official of the Indianapolis company has recently said, "the day is now here when the Bell telephone licensees can take down their wires and sell them for junk, throughout the State of Indiana; and their abandonment will never be missed by the telephone-using public."

When such a statement as that can be made with a large measure of truth it means something. It indicates a condition of affairs, which THE AMERICAN TELEPHONE JOURNAL has described before, it is true, but one that cannot be too often elaborated upon, not only for the enlightenment of the public in general and lay publications, but for the encouragement of Independent operators everywhere. There is an old saying that "nothing succeeds like success," and by the same token Independent telephony has a great future. The experimental period has passed. The reason of uncertain struggle against unscrupulous monopoly, with capital looking askance and the people to be benefited often unappreciative, if not actually hostile—these things have all in a large measure passed. The future is full of hope and promise, and, after all, it is not the Independent companies alone that will reap the richest reward, but the public at large, with whom any proper development of telephone service is of supreme importance.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

AGREEMENT WITH ABUTTING OWNER'S GRANTOR.

A TOLL line that was built six years ago extends along a farm, and the owner at that time gave permission for the line to be put there. The farm was sold and the present owner requests us to move the line, and even threatens to cut down the poles if not removed. Will you kindly advise us?

IN Illinois it is held that a telephone line is an additional burden on the highway, entitling the abutting owner to compensation. Board of Trade Teleg. Co. vs. Barnett, 107 Ill., 501, 1 Am. El., cas. 565. The answer to your question therefore depends on the agreement made six years ago between your company and the former owner of the farm. If it amounted to a deed of the right of way along the farm, the present owner has no right to make you move the line. If it was only a license, it is revocable at any time. If it was mere permission unpaid for and without definite terms, it does not bind the present owner, and he may compel you to move. I think he has no right to destroy your poles in any event, his remedy being by ejectment. Els. vs. Am. Teleph. & Teleg. Co., 143 N. Y., 133, 38 N. E., 202. If there is danger of his cutting them down I would secure an injunction to prevent him from doing so.

POLICY REFERS TO DIRECT DAMAGES.

THE case of the Wausau Telephone Company against The United Fireman's Insurance Company, of Philadelphia; The German-American Insurance Company, of New York; The Lumberman's Insurance Company, of Philadelphia, and the Palatine Insurance Company, Limited, of London, England, has been won in the circuit court of Webb County, Wisconsin, by the Wausau Telephone Company. The insurance companies above mentioned refused to pay a fire loss of \$1,000 sustained by the telephone company on the evening of February 6, 1902. The insurance companies refused to pay the loss because the fire was started by an electric current caused by the crossing of electric light and telephone wires. Each of the companies had attached to its policies a clause as follows:

"This instrument does not cover any loss or damage to property caused by electric currents, whether artificial or natural."

The telephone company contended, first, that the clause above mentioned referred to damage other than loss by fire or what is designated in decisions of courts as direct damages, such as shattering or damaging or other injuries not resulting in fire; second, if it was construed to mean fire loss, it would be a violation of the statute of Wisconsin prescribing a standard policy of fire insurance. The company, therefore, brought action against the insurance companies to recover loss. The judge decided that the plaintiff's theory of the case was the correct one and that the insurance companies were liable.

GRANT AGAINST PUBLIC POLICY.

THE temporary injunction that has restrained the Union Electric Telephone Company, of Moline, Ill., an Independent company, from using the line it had built from Moline to Milan has been dissolved. The injunction was granted at the suit of the Central Union Telephone Company on the ground that the latter company had an exclusive right of way on one of the streets of the city. It had not purchased the exclusive right over the whole route of the other company, but had secured a contract from property owners giving it the exclusive right in the intersection of two streets in Milan which were crossed by the Union Electric Company's line. Counsel for the Union Electric Company contended that an exclusive grant, such as the Central

Union claimed, was void because opposed to public policy. The circuit judge of Rock Island County sustained this contention and dissolved the injunction.

SUBWAY PERMITS REFUSED.

A DECISION has been handed down by the Appellate Division of the Supreme Court of New York, affirming an order by Justice Clarke denying a motion for a peremptory writ of mandamus asked for by the Independent Telephone Company, of New York, to compel Robert Grier Monroe, then Commissioner of Water Supply, Gas and Electricity, to issue permits to the company to lay and maintain telephone wires in the low tension subway and to have additional subways of the kind constructed in various localities.

The company claimed that it had a franchise to install such a system as their service demanded, but the Commissioner contended that under the charter of 1898 such franchises are restricted, and the Commissioner given the discretion of issuing or refusing permits. The order denying the motion was affirmed by the Appellate Division, but without opinion.

STREET RAILWAY AND TELEPHONE WIRES.

THE application made by the Iola Telephone Company, of Iola, Kan., for an injunction against the Iola Electric Railway Company to prevent the latter from setting their poles in such a way as to interfere with the wires of the telephone system has been decided in favor of the railway company.

The telephone company alleged that the electric line poles were to be erected under its 25-wire line to Cementville; that these high poles would pass between the wires, pulling them out of line and endangering life by risk of a heavy current getting into the telephone wires. In case of storm a telephone wire might fall down on the heavily charged wire that feeds the trolley and do serious damage to persons and property. The telephone company claimed that it had a right in the street long before the electric company was thought of, and that their wires have the first place on the street. The railway company demurred to the petition of the telephone company and the demurrer was sustained.

AN EXCLUSIVE CONTRACT UPHELD IN CANADA.

AT Hamilton, Ont., Justice Britton has overruled a motion to quash the by-law or ordinance under which the Bell Telephone Company secured the exclusive right to erect poles and maintain a system on the streets of the city for five years from August 24th of last year. The argument against the by-law was that it was illegal, that the Council exceeded its powers in creating a monopoly, and that it was in restraint of trade and commerce. The most important objection to the by-law was that, the company being incorporated by a Dominion act for the general advantage of Canada, an act of the Legislature authorizing such by-law by a municipality was *ultra vires* or in excess of its powers. To this contention answer was made that the city had been authorized to pass a by-law, which was subject to the higher powers of the Dominion Parliament.

Charges of fraud were freely made during the argument, it being asserted that the company had subsidized the press of the city by advantageous contracts and had used improper means to influence aldermen, entertaining a deputation that visited certain United States cities for the purpose of securing information. These assertions were held incompetent for the purpose of attacking the by-law.



IN THE OPERATING FIELD.

DES MOINES MUTUAL REFINANCING.

PLANs have been practically perfected for refinancing the Mutual Telephone Company, of Des Moines, and a special meeting of the stockholders was held to ratify them. There is practically no question but that the new plan will be successful and the entire system there rebuilt, giving it connection with toll and rural lines reaching every county in Iowa, with a total of more than 100,000 subscribers. The preliminaries have progressed sufficiently to insure the beginning of the work of rebuilding within a few months so that it will be practically completed this summer. The additional capital, making the total capitalization of the reorganized company \$450,000, will be furnished by an Eastern syndicate. The stockholders voted unanimously in favor of it. J. S. Bellamy, of Knoxville, former State Senator, president of the Marion County Telephone Company, the Knoxville Electric Light and Water Companies, and also of a valuable exchange at Hutchinson, Kan., was engaged to go to Des Moines at once and superintend the work of rebuilding the exchange. Charles C. Deering will be retained as superintendent. At present, the authorized capital of the company is \$90,000, of which \$30,000 is preferred stock and the remainder service stock. The proposed change is to increase the preferred stock to \$60,000 and the service stock to \$90,000, and also to authorize the issue of \$300,000 common stock. Of the present capital, the \$30,000 preferred stock is paid up and about \$25,000 of the service stock has been subscribed for. Under the present limitations, the limit of indebtedness is about \$37,000. The change will increase this limit several times. The offer of the syndicate of Eastern capitalists, which has been practically accepted, is for them to take the additional \$30,000 preferred stock and to float a bond issue of \$150,000. The directors have practically decided upon plans for the new exchange. It is to be a lamp line signal, multiple central energy system, equipped at present to accommodate 3,500 telephones and with a maximum capacity of 10,000.

INDEPENDENT MEETING AT CHILLICOTHE, MO.

RECENTLY the Second and Third Congressional District Independent Telephone Association held a meeting at Chillicothe, Mo., and discussed the toll line rates. The purpose of the meeting was to adjust toll rates.

The following were present: A. Barnes, president, Hamilton, Mo.; H. M. Patterson, secretary and treasurer, Meadville, Mo. The following gentlemen, who are directors, were also present: C. D. Mayhugh, Moersville, Mo.; J. S. Cox, Breckenridge, Mo.; O. B. McCoy, Chula, Mo.; C. M. Thompson, Cogill, Mo.; J. H. Higdon, Kingston, Mo.; J. M. Decker, Dawn, Mo.; B. F. Brady, Braymer, Mo.; W. S. Clark, Hamilton, Mo.; E. T. Messenbaugh, Braymer, Mo.; J. H. Letton, Lost Springs, Mo.; E. M. Inglehart, Appleton, Mo.; J. L. Boyle, Sampson, Mo.; J. R. Herford, Hale, Mo.; Mrs. M. Mansfield, Spring Hill, Mo.

FINANCE ESPOUSES INDEPENDENT CAUSE.

FINANCE, the weekly financial, commercial and telephone paper, published at Cleveland, Ohio, which is one of the few financial papers published in America, not under the control of the American Bell Telephone Company, proposes in the future to wage relentless war against those who have been belittling Independent telephone securities. As is generally known, there has been a carefully planned campaign conducted by the American Bell Company, which has partially prejudiced capital against In-

dependent telephone investments. *Finance* feels that the only way to counteract this sentiment is to periodically put before the men with money to invest a simple statement of facts of what is being done now and what can be done with money invested in Independent telephone plants. The paper has decided to make a special subscription rate for the period, during which the articles will be published showing up the Independent situation. This is done in order to enable any who wish to place the proposition before investing associates the opportunity of doing so. In its letter *Finance* makes the following statement: "This paper is the only financial paper published in America not under the control of the American Bell Telephone Company, and we propose to do what we can to correct the general prejudice against the American Independent telephone companies."

PITTSBURGH AND ALLEGHENY EXTENSIONS.

THE Pittsburgh & Allegheny Telephone Company, the lines of which now stretch into all parts of the east and north, recently took important steps to extend its system into the south and west. A charter was issued at Charleston, W. Va., to the Pittsburgh & Wheeling Telephone Company, the purpose of which is to build and operate a telephone line from this city to Wheeling. Prominent among the incorporators of this company are J. G. Splane, president, and R. C. Hall, a director of the Pittsburgh & Allegheny Telephone Company. Other incorporators are J. A. Howard, J. P. Young and F. C. Hancock, all of Wheeling, and all connected with the National Telephone Company, a strong Independent company of Wheeling. The new company is capitalized at \$100,000, and the work which it is proposed to carry out will be done by the Pittsburgh & Allegheny. The latter's lines now run to Wilson, on the Monongahela River. From this point they will be taken south to a point within twelve miles of Wheeling, where they will meet the lines of the National, it being the intention of that company to build six miles of additional line. With a through connection to Wheeling the Pittsburgh & Allegheny will be in an admirable position to extend its long-distance service to the west and south, something which will ultimately be done.

A MISSOURI, ARKANSAS AND INDIAN TERRITORY ASSOCIATION FORMED.

REPRESENTATIVES of Independent telephone lines of southwest Missouri, northwest Arkansas and northeast Indian Territory met recently at Gravette, Ark., and organized the Tri-State Independent Telephone Association, with officers as follows: President, W. T. Stahl, of Siloam Springs; vice-president, S. H. Slaughter, of Fayetteville; secretary, K. J. Comfort, Westville; treasurer, W. D. Wasson, of Gentry. The object of the association is the betterment of local and long distance service. It will also endeavor to devise plans for farmers' lines in its territory. Their next meeting will be held at Fayetteville in June.

ABILENE-TOPEKA TOLL LINE COMPLETED.

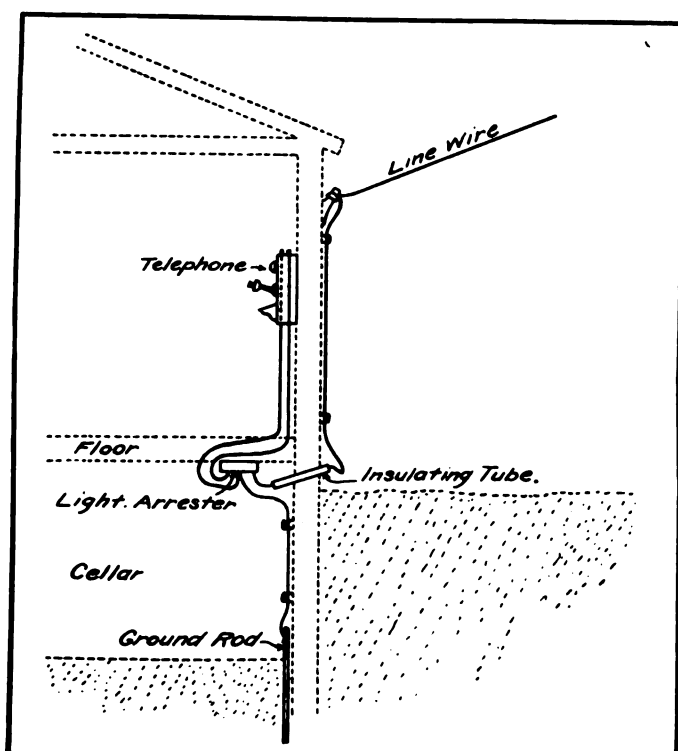
THE Union Telephone and Telegraph Company, which is composed of the Brown Telephone Company, of Abilene, Kan., and fourteen other exchanges in that part of the State, has completed its line from Abilene to Topeka, with the exception of making office connections. This is essentially a toll line, and through copper metallic circuits will be maintained

from Abilene to Kansas City, with no intermediate stations cut in the line. Metallic circuits will extend to all the principal points in Kansas. C. P. Dewey, of Manhattan, is president of the company; A. T. Rodgers, of Wamego, is vice-president; C. L. Brown, of Abilene, is secretary; and J. W. Smith, of Minneapolis, is treasurer.

INSTALLATION OF TELEPHONES AND PROTECTION ON GROUNDED LINES.

By J. MILTON HALL, Branchport, N. Y.

AS the earth forms one-half of a grounded circuit, it is important that the ground connection should be beyond the reach of frost in winter and of drought in summer. A plan that has been successively used is to carry the leading-in wire down the outside of the building and into the cellar at a point as near as possible under the place where the instrument is to be located, and attach it to the combined fuse block and lightning arrester; from this the wire is run up through the floor and attached to one binding post of the instrument. From the opposite



binding post run the wire down through the floor, and give a "skinned" half inch of it a full turn about the binding screw of the arrester, then carry the wire the shortest way to the ground rod, to which it should be well soldered. This provides for the location of the ground rod in the cellar, by which means, if the rod be not less than one-half inch in diameter and three feet in length, the conditions stated at the outset are complied with.

The use of a single wire for grounding both the telephone and the carbon arrester affords a certainty that the arrester is grounded, so long as the instrument is in working condition. This is important because the fuse block alone affords but slight protection against high potential discharges of lightning. Additional protection is also secured by the use of a 5 ampere line fuse at the jumper wire connection. This mode of installation has proven very successful and commends itself for these reasons: The ground rod is placed beyond the reach of both drought and frost; the arrester is beneath the telephone, near the ground connection, and away from inflammable substances; and a certain test of the security of the ground connection is always at hand.

NEW TELEPHONE COMPANY'S REPORT.

THE annual meeting of the New Telephone Company was held in Indianapolis recently. Fifty of the eighty-five stockholders, representing 3,500 of the 4,000 shares of stock, were present. The proposed reorganization scheme, by

which the property of the company is leased to the Indianapolis Telephone Company, was unanimously adopted. The new board of directors is composed of Lewis C. Walker, B. E. Parrott, John W. Bowlus, John J. Sherrin, I. D. Wiest, F. L. Hollweg and L. W. Ott. Lewis C. Walker, a prominent attorney of Indianapolis, was elected president of the New Telephone Company, John W. Bowlus, vice-president; I. D. Wiest, secretary, and H. B. Sale, treasurer. The report of H. B. Sale, retiring secretary, is as follows:

Total gross earnings.....	\$227,196
Increase in gross earnings over previous fiscal year.....	44,626
Operating expenses, depreciation, fixed charges and dividends	177,410
Total surplus for year.....	49,786
Total surplus February 29.....	130,228
Number of telephones in operation February 29, 1904....	8,442
Number of telephones in operation March 1, 1903.....	6,713
Total increase.....	1,729
Average monthly increase.....	145

S. B. Sherrin will be president of the Indianapolis Telephone Company, which was formed to take over the new telephone company.

NORTHERN INDIANA AND SOUTHERN MICHIGAN TOLL LINE ASSOCIATION MEETING.

THE Northern Indiana and Southern Michigan Toll Line Association, which organized recently at South Bend, Ind., will meet again at Plymouth, Ind., to complete the details. The association represents a territory embracing 15,000 Independent telephones and 2,000 miles of toll lines. The cities interested are: South Bend, Elkhart, Goshen, Michigan City, Benton Harbor, Knox, Hamlet, Winamac, Kewanna, Wakarusa, Millersburg, Dunlap, Warsaw, Plymouth, Rochester, Bremen, Nappanee, Milford, Columbia City, Silver Lake, Star Point, Argos, North Judson, Teegarden, Bristol, and La Grange. Theodore Thorward, South Bend, is manager of the new association; J. K. Johnson, Elkhart, is secretary-treasurer.

NEW ENGLAND INDEPENDENT EXTENSIONS.

THE commencement of a movement towards the extension of the Independent telephone system throughout Massachusetts and Rhode Island is signalized by the incorporation of a new company, designated as the Automatic Telephone Equipment Company. The new organization is distinct from the company which operates the lines in New Bedford and Fall River, but it is not intended to infringe on the privileges of the present company.

The stockholders of the new company are in a large measure holders of stock in the company which is now carrying on business. Vinton A. Sears, of the new corporation, was in New Bedford in the interests of the company.

CUYAHOGA'S NEW SWITCHBOARD WORKING.

THE new Cuyahoga telephone switchboard at Cleveland, Ohio, has been formally cut in and has been in constant use. The change was accomplished without difficulty, but owing to various things, including rainy weather, there was some slight difficulty in its operation, but all this has been removed and the new switchboard is working splendidly.

TELEPHONE MEETING IN TERRE HAUTE.

REPRESENTATIVES of Independent telephone exchanges in eastern Illinois and western Indiana, with a total of 14,000 telephones, met in Terre Haute recently, and arranged uniform long distance rates. A secretary will give his entire attention to the matter.

TELEPHONE BILL PASSED IN TENNESSEE.

HOUSE bill 29, in the Tennessee legislature, authorizing telegraph and telephone companies to exercise the right of eminent domain, was recently, after considerable discussion on both sides, passed.

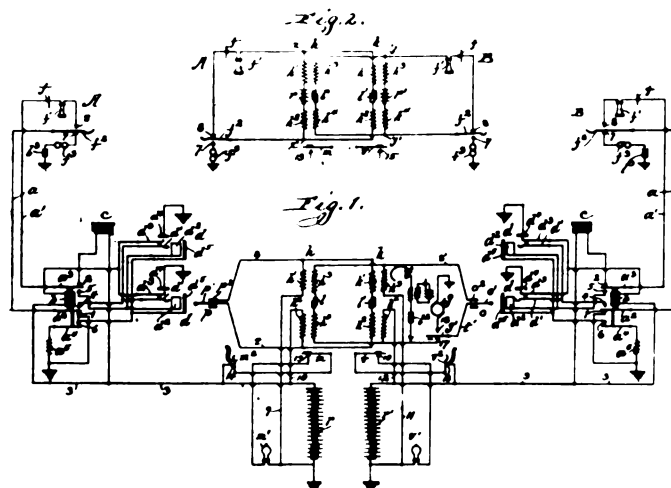
TELEPHONE



PATENTS

IMPROVED COMMON BATTERY TELEPHONE CIRCUIT.

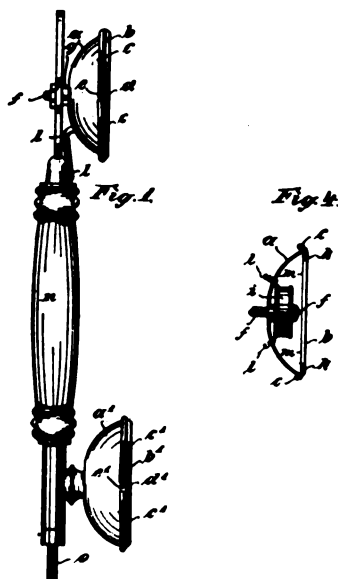
J. H. Lendi, Chicago, Ill., patents (No. 751,797) an improved common battery system and assigns to the Kellogg Switchboard and Supply Company. The object of this invention is to combine



a repeating coil and supervisory signal into one piece of apparatus. There is in each operator's cord circuit a complete circuit as shown in Fig. 1, and a diagrammatic representation in Fig. 2. The substation apparatus and that of the answering jack with associate signals is the same as in the usual Kellogg circuit. Two common batteries r and r' are supplied, in the circuit of each of which there is a split repeating coil, the winding being shown by h' , h_2 , h_3 and h_4 and k' , k_2 , k_3 and k_4 . One of these windings is in circuit with the battery r , and may be employed to operate the supervisory signal. The other winding is opened to battery current by means of the condenser l . Thus one side of the circuit repeats to the other side while the windings carrying battery current are employed for signalling.

CASING FOR RECEIVERS.

P. Hardegen, Berlin, Germany, patents (No. 753,391) an improved casing for telephone receivers. It is illustrated in Figs.

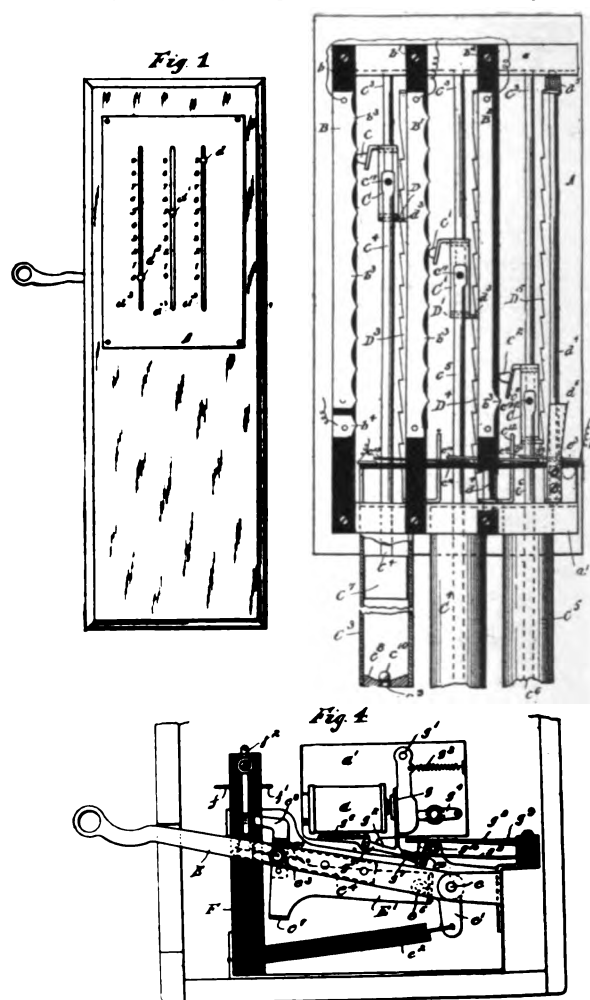


1 and 2. The inventor provides a thin iron or steel case a which is pressed into a bell-shaped form. To this is attached a core of iron or steel f and around this core is placed the spool i containing the winding. The casing a is secured to the core f and then

the whole attached to the handle n by means of the screw f . The diaphragm m is protected by means of a cover b which has an edge r to which two semi-circular springs c c are attached whereby the cover is sprung over the edge of the casing a and thus retained in position.

AUTOMATIC TELEPHONE SYSTEM.

J. K. Nostrom and J. J. Brownbugg, Chicago, Ill., patent (No. 752,251) an improved automatic telephone system and assign to The Globe Automatic Telephone Co., Chicago. The object of this invention is to provide an automatic telephone system whereby no operators will be required at the central office. This is a complicated patent, requiring six sheets of drawings and six

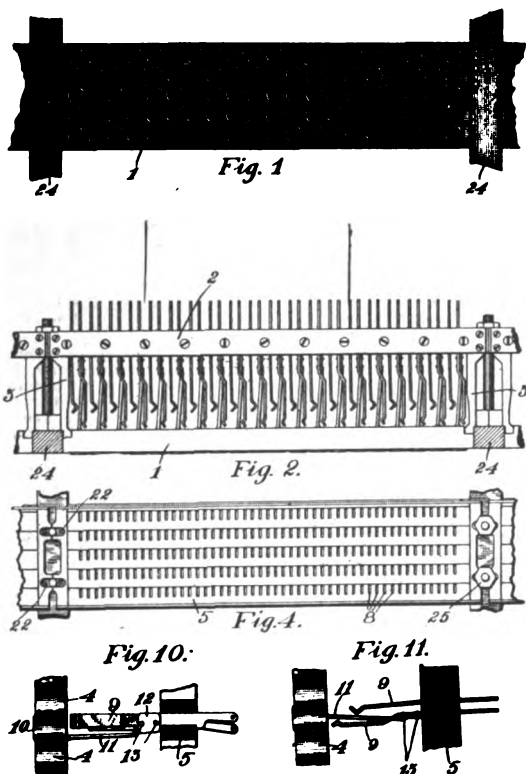


pages of specifications to display them, and which cannot be adequately abridged. Those who are interested in this invention would do well to procure a copy of the patent. To describe the essence of this invention briefly, refer to Figures 1, 2 and 4. Fig. 1 is the elevation of the sub-station instrument, from which it will be seen that there are four slots carrying numbers. Through each of these slots a handle projects. The subscriber calls by moving the respective handles, so that they stand opposite the combinant digits of the number he desires. Each handle operates sliding contact which is placed over vertical strips shown in Fig. 2, carrying corresponding contact points. As soon as the handles are set, the subscriber removes the telephone from the hook switch shown in Fig. 4. This releases the first handle, which by gravity slides to the home position at the base of the slot. As the sliding contact travels over the points an impulse is sent over the line for each point. These impulses operate a selector at

the exchange, which is in a general way similar to that employed by the Strowger system. By this means subscribers' lines can be connected with each other without the intervention of an operator.

IMPROVED JACKS FOR TELEPHONE SWITCHBOARDS.

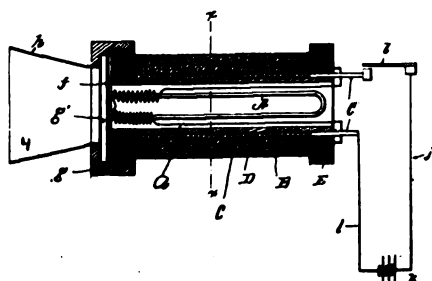
Alfred Stromberg, of Chicago, Ill., patents (No. 752,722) an improved method of manufacturing multiple jacks for switchboards, and assigns to the Stromberg-Carlson Telephone Manufacturing Company. This invention is shown in Figs. 1, 2, 4, 10 and 11. The essential features consist in making the jacks in banks of 100 instead of in banks of 10, and building the bank so that it consists of a front and rear support, which carry the springs and thimbles without any other intervening sub-stations.



The front of the bank jacks is shown in Fig. 1, the plan in Fig. 2, the rear elevation in Fig. 4, and details in Figs. 10 and 11, from which it appears that the front consists of a frame of any insulating material into which the holes for receiving the thimbles are bored. The rear consists of a series of banks, which are shown in Fig. 4, and which are slotted to receive the springs. Thus this device presents a system for constructing jacks in skeleton, thereby saving considerable room in the switchboard.

IMPROVED APPARATUS FOR PRODUCING SOUND SIGNALS.

C. H. O'Brien, Augusta, Me., patents (No. 752,408) an improved method of electrically producing signals by sound. This

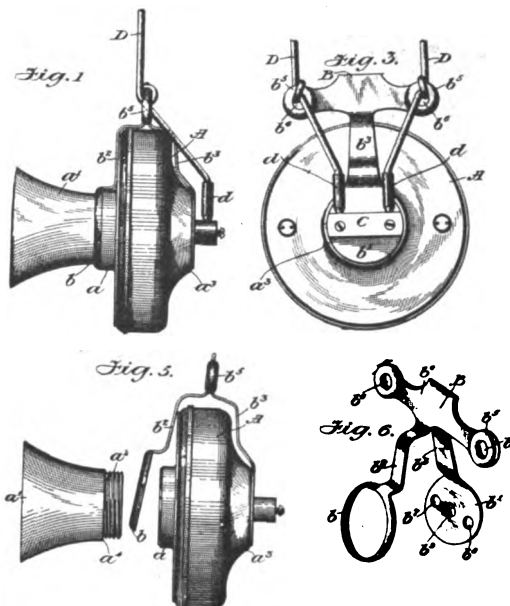


invention is shown in the figure, which consists of a diaphragm, *f*, to which is attached a mouthpiece, *h*. The diaphragm is placed in front of a magnet, *A*, which is in circuit with battery *k* and a circuit breaker, *i*. There is also an induction coil consisting of

a primary *B* and a secondary *C* that is wound around the magnet *A*. When the battery circuit is closed the circuit breaker *i* operates and rapidly interrupts the current. It is alternately magnetized and demagnetized, the magnet *A* setting the diaphragm into violent vibration and producing a shrill tone.

HANGER FOR TELEPHONE TRANSMITTERS.

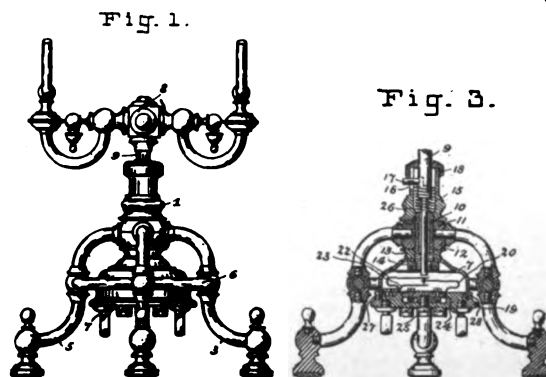
Michael Setter, Chicago, patents (No. 752,184) an improved method of suspending telephone transmitters and assigns to The



American Electric Telephone Company, Chicago. The object of this invention is to provide an improved device whereby transmitter heads may be suspended by a flexible cord or support. This is illustrated in Figures 1, 3 and 6, from which it appears that the inventor provides a punching stamp of thin metal of the form shown in Fig. 6. The front portion of the punching is ring *b*, which is designed to be placed underneath the mouth piece of the transmitter and secured by screwing the mouth piece home. The rear of the punching piece over the back of the transmitter is secured by screws passing through the holes *b7*, *b8*, *b9*, then by means of the holes *b6* the transmitter may be suspended by a cord, as is shown in Fig. 3.

IMPROVED DESK SET.

L. M. Ericsson, Stockholm, Sweden, patents (No. 753,563) and assigns to the Ericsson Company of Stockholm, an improved



desk set. This invention is shown in Figs. 1 and 3, Fig. 1 being an elevation and Fig. 3 a section. The inventor provides a central portion *1* carried by the feet *2*, *3*, *4* and *5*, held by the ring *6*. The hook-switch is contained in the portion *8* and consists of the springs shown in Fig. 3. Through the center *1* of the station a rod *9* plays vertically. This rod carries two brackets as shown in Fig. 1 upon which the combined receiver and transmitter is supported. When the combined instrument is in place the rod *9* is depressed and the contacts of the hook-switch opened.



THE WEEK'S MESSAGES

FRANCHISES.

HUNTSVILLE, ALA.—An agent for John Monteith's heirs and assigns has introduced an ordinance into the city council granting a franchise for an independent telephone company.

OTTAWA, CANADA.—The Civic Telephone Committee has decided to recommend the city council to grant a twenty-one year franchise to the new Canadian Telephone Company to operate in the city of Ottawa.

ROANN, IND.—The city council has granted a franchise to the Disko & Laketon Telephone Company to construct a local exchange.

ADAMS, KAN.—The Adams Telephone Company has been granted a franchise for a local telephone system and will begin construction at once.

STARKS, ME.—The selectmen have granted a franchise to the Somerset Farmers' Co-Operative Telephone Company to construct its lines along all the roads of the town.

CHAMBERSBURG, PA.—The city council has passed an ordinance granting the Cumberland Valley Railroad Company a franchise to construct its private telephone line.

HILLSBORO, TEX.—The Independent Telephone Company has asked for renewal of its franchise, the old franchise having expired by time limit, as no move had been made toward constructing a system.

COMBINATIONS

LEWISTON, IDAHO.—The Lookout Telephone Company has sold its plant for \$1,800 to the Interstate Co-Operative Company, of Moscow. Manager H. K. Moore, of the purchasing company, says that lines will be extended from Moscow to Guinness, Lewiston, Kindrik, Julietta and Leland.

WARREN, IND.—George Griffith and Frank Canaday have purchased the Warren telephone plant and will take charge April 1st. The plant has been in operation five years and includes a number of country lines. The new owners propose improving the exchange and extending the lines.

GRUNDY CENTER, IA.—The Grundy Center Mutual Telephone Company has purchased the business of the Cedar Valley Telephone Company in this city.

RATES

PAOLI, IND.—The Hoosier Telephone Company, of this place, has served notice on its patrons that on May 1 the rates will be advanced from 75 cents for dwelling houses to \$1, and from \$1 for business houses to \$2 a month.

ELECTIONS

IOWA FALLS, IA.—The Central Iowa Telephone Company has elected J. R. Skinner, of La Porte, president; J. H. Funk, of Iowa Falls, vice-president; W. J. Broecksmith, of Shenandoah, secretary and general manager; W. V. Shipley, of Iowa Falls, treasurer. The company decided to make the usual number of extensions and improvements the coming season, and has in contemplation several lines in this part of the State.

PERSONAL

L. G. McMEEN, who has been investigating the field with a view to the considerable extension of the Mexico City telephone system, has completed his report and is now back in the United States.

WILLIAM PATTON, of Kansas City, Mo., has been employed to manage the long distance lines of the Western Independent Telephone Company, which surround Kansas City, and connect with the various independent companies.

W. A. REQUA, late of the Higgins Almstead Company, has just taken the management of the telephone department for McDonnell & Drummond, dealers in gas fixtures and electrical supplies, of Rochester, New York. Mr. Requa is very well known in the electrical trade in his section.

C. E. WILD, who has been division superintendent for two years for the Michigan Telephone Company, at Menominee, Michigan, has been transferred to Grand Rapids to assume a district superintendency there.

LE ROY W. STANTON, the consulting telephone engineer, has opened an office in Chicago in connection with Bryan B. Carter, mechanical engineer, in the Monadnock Building.

MISCELLANEOUS

TERRE HAUTE, IND.—At a meeting held in this city on the 2d inst., by representatives of independent telephone exchanges in eastern Illinois and western Indiana, with a total of 14,000 telephones, arrangements were made for a uniform long-distance rate. An association was formed and a secretary employed to give his entire time to the unifying of distances and applying the schedule rate adopted.

CONSTRUCTION

HARLAN, GA.—President Hatcher, of the Silver River and Lindale telephone line, is planning to construct a local system and other lines.

DURAND, ILL.—The Durand Telephone Company is planning to install a new switchboard this spring, in order to handle its increased business. It will also construct several new lines.

DEXTER, IND.—Farmers of Polk's Bottom are talking of building a telephone line to connect with the home line here.

SCHLESWIG, IA.—The Schleswig Telephone Company will build thirty miles of extensions this spring.

WATERLOO, IA.—The U. S. Telephone and Telegraph Company, of Waterloo, is arranging to connect with farmers' lines now in existence or that hereafter may be constructed.

ABILENE, KAN.—The Union Telephone & Telegraph Company, which is composed of the Brown Telephone Company, of this city, and fourteen other exchanges in this part of the State, has completed its line to Topeka. This is a metallic circuit, and will furnish direct communication with Kansas City. The following are the officers: C. P. Dewey, Manhattan, Kan., president; A. T. Rodgers, Wamego, vice-president; C. L. Brown, Abilene, secretary; J. W. Smith, Minneapolis, treasurer.

GREENBURG, KAN.—The directors of the Greenburg Telephone Company have decided to construct a long distance line to Wellford at once. Floyd Bert resigned as secretary of the company, and Mrs. Frank Lyon was elected to succeed him.

HERINGTON, KAN.—The Herington Telephone Company will rebuild its system, installing a new central office equipment.

ASHLAND, MICH.—The Independent Wisconsin Telephone Company is arranging to extend its lines from Ashland to Bessimer, and from there to Marinette.

CEDAR RIVER, MICH.—Crawford & Sons, timber operators of this place, will construct a telephone line to Stephenson in the spring.

SOUTH LYON, MICH.—The South Lyon Telephone Company has contracted for several new rural telephone lines to be run from this village. It is expected that 300 new telephones will be added to the system, which now consists of 200 telephones.

NEW PAYNESVILLE, MINN.—A. A. Williams, superintendent of construction of the Minneapolis Telephone Company, is here arranging for changes and improvements contemplated in the local exchange.

N. Y. MILLS, MINN.—An independent telephone company is being organized here to construct a local exchange and extend line into the country adjacent.

ST. PAUL, MINN.—The city council is considering a proposition to install an intercommunicating system in the Central High School.

KALISPELL, MONT.—The Farmers' Board of Trade has been organized in Flat Head County, with M. T. Small, a farmer living east of the Flat Head river, as president. The association will construct a complete telephone line to supply each member with telephone service, all of which will be connected with the central office here.

GUIDE ROCK, NEB.—A telephone company will be organized here to construct a local system.

PEMBERTON, N. J.—A company is to be formed here to construct a telephone line to Chatsworth.

FULTON, N. Y.—The Fulton Telephone Company is formulating plans to enlarge its system in the spring at a cost of several thousand dollars.

LYONS, N. Y.—The Lyons Telephone Company is planning to extend its line to Alton.

SAVONA, N. Y.—M. A. Beard and other farmers living between Savona and Bradford, are arranging to construct a rural telephone line connecting their homes with those places.

CHRISTIANSBURG, O.—The Troy Telephone Company is arranging to extend its lines this spring.

COLUMBUS, O.—The directors of the Citizens' Telephone Company will probably build an extension to the company's plant at the corner of 3d and Long streets.

BROWNSVILLE, ORE.—The Pioneer Mutual Telephone Company has leased a new building and will install its central office in it.

ALLENTOWN, PA.—The Lehigh Telephone Company will install a telephone system for the Ironton Railroad, to be used for train dispatching.

SIOUX FALLS, S. D.—C. S. Howard, of Edgerton, Minn.; William Lockwood, of Pipestone, Minn.; B. F. Hinkley, of Luverne; Frank Bills, of Yankton, S. D., and others, met here recently to arrange plans for a complete South Dakota long distance system of lines.

VOLGA, S. D.—The Dakota Central Telephone Company has decided to extend its line south from this place to Wentworth.

PAROWAN, UTAH.—Dr. George W. Middleton and others have purchased the telegraph line between here and Cedar City, and are arranging to use it as the basis of a telephone line.

FRANKSVILLE, WIS.—Dr. Corr, William Gifford and others are arranging to construct a rural telephone line.

PLEASANT PRAIRIE, WIS.—The Pleasant Prairie Telephone Company will construct a line to Bristol.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



TRANSFER CIRCUIT.—(299.)

Will you kindly advise me what you consider the best transfer for the old style magneto switchboard, giving diagrams if convenient, and greatly oblige a very much interested subscriber?
N. Y. M.

When there are more than three operators' positions in a non-multiple magneto switchboard, each of the positions should have transfer circuits to all non-adjacent positions, thereby providing a means of extending any subscriber's line to a remote position.

Fig. 299a shows a two-way transfer circuit which terminates in a lamp signal and connecting jack; the operation being:

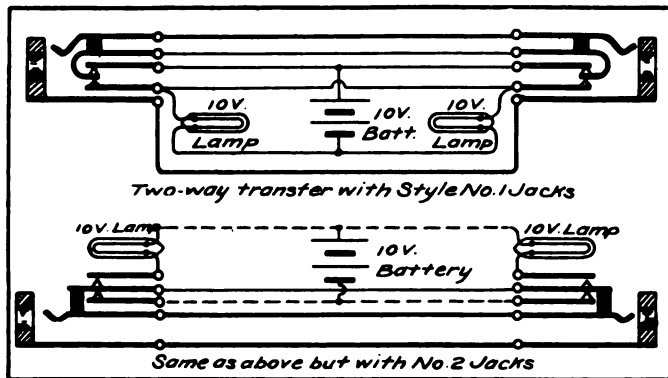


Figure 299a.

1. Inserting plug in one jack lights both lamps. The lamp at the calling end serves as a check on the second operator's actions, while the other lamp serves as a signal to call the second operator.

2. Inserting plug in other jack extinguishes both lamps. The second operator receives the order for the desired party from the first operator and completes the connection with the cord circuit and rings in the regular manner. When either subscriber rings off the clearing out drops are operated in both operators' positions.

3. Removing either plug from transfer jack lights both lamps, which remain lighted until the plug at the other end is removed, when both lamps are extinguished and the circuit is restored to its normal condition.

It will be noticed that each operation has a check signal, which prevents any "hanging up" of the circuit, and that the transfers can be used in either direction. There is a disadvantage, however, in having the second operator ring the subscriber and in using two complete cord circuits in the completed connection.

The transfer circuit shown in Fig. 299b eliminates the disadvantages just mentioned, but can only be used in one direction, thus necessitating more transfers and requiring an order wire circuit (talking circuit) to each non-adjacent operator for ordering up connections. The outgoing end of this circuit is provided with a spring jack A, while the connecting end is provided with cord and plug B, a disconnected lamp C, and a plug seat switch D. In making transfer connections, the operator desiring the same presses the order wire key, which will connect her talking circuit directly with that of the operator on whose position such line terminates, specifying the transfer circuit to be used. The second operator simply inserts the transfer plug into the required line jack, and the originating operator rings the subscriber and has direct supervision of both parties. When the first operator pulls down the cord circuit, the local contact of the outgoing transfer jack A, Fig. 299b, will be established, lighting the disconnected lamp C at the second operator's position. The dropping of the transfer plug B into its seat operates the switch D, thereby extinguishing the disconnected lamp.

From the operating standpoint the latter transfer circuit is the most efficient of the two, although the first cost is greater.

VOLTMETER RESISTANCE MEASUREMENTS.—(300.)

Can you give me a simple method by which I can measure resistances with a voltmeter, as that is the only measuring instrument that I have?

O. A. O.

Fig. 300 shows how this result may be accomplished. Referring to the circuit it is seen to consist of a battery and a known resistance of 10 ohms connected in series with the resistance X ohms whose value is sought. The first step is to connect the voltmeter around the known resistance, as shown in Fig. 1, and take a reading, which in this instance is assumed to be 4 volts, this value representing the drop in potential due to the passage of the

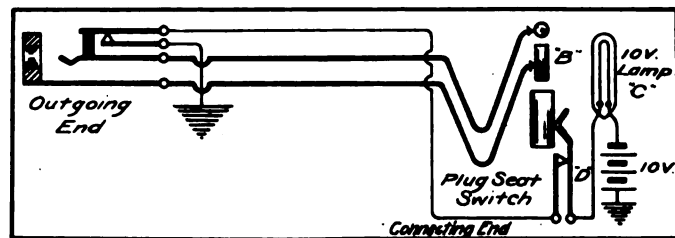


Figure 299b.

current through the resistance of 10 ohms. The drop in potential between any two points in a circuit is equal to the current, flowing through the circuit, multiplied by the resistance between the points considered, or if E represents the drop, C the current flowing through the circuit and R the resistance considered, then $E = C R$. In this case $E = 4$ volts, $R = 10$ ohms, therefore $C = .4$ ampere. Knowing the value of the current flowing through the circuit, the next step is to connect the voltmeter around the unknown resistance, as shown by the dotted lines in the diagram.

In this case it is assumed, for example, that the voltmeter shows a reading of 6 volts, then by again applying the formula

$$E = C R$$

and substituting the known quantities, we have

$$6 = .4 \times R, \text{ or } R = 15 \text{ ohms.}$$

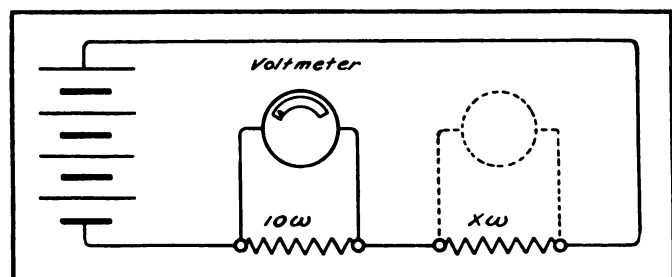


Figure 300.

FORM OF OPERATOR'S RESPONSE.—(301.)

In next to the last paragraph of Mr. Hume's article, on page 9 of your issue of January 2d, "unnecessary and useless preliminaries in using the telephone" are referred to but not designated. Kindly advise us fully what they are and what is really "good form" and good business.

A. S.

Mr. Hume's article pointed out the desirability of a uniform switchboard method in making telephone calls. The subscriber should remove the telephone from the hook and wait until the operator answers with the query, "Number?" The operator then repeats the number in order that the subscriber may see that no error has been made. The subscriber should then wait until the party called for answers, or until the operator informs him that the line is busy.

BOOK NOTICES

Any book herein reviewed will be sent post paid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

THE TECHNICAL WORLD, VOLUME I, NUMBER I. Published by the American School of Correspondence. This is the first issue of a new magazine recently started by the American School of Correspondence, of the Armour Institute of Technology, Chicago, Ill. Subscription price, \$1.00 per year.

The object of the magazine is to present to students and the technical men, from time to time, matters which appear to be of peculiar interest to them as an aid either in the pursuit of further information or in the practice of every-day professional work. It is intended that each issue shall contain articles, from specialists in all branches of engineering work and manufacturers, which shall treat of the salient questions of the day and place before the readers of the journal the freshest and newsiest information obtainable on each topic. The magazine is to be published monthly, and, judging from the first number, will be a welcome visitor to all who are interested in science. For example: The first article is devoted to a description of that newest and most astonishing scientific discovery, radium. Succeeding this is a short account of milling machines, and then comes an article upon wireless telegraphy. Exhaust steam heating receives three or four pages, while the balance of the magazine is devoted to a review of current engineering progress, and an index of current technical literature. There is a descriptive article on technical schools and a well edited query column.

TRADE NOTES

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., reports that the Seymour Home Telephone Company are installing a 500 line board of the New Lamp Signal type of its manufacture.

G. M. GEST, the expert subway contractor, of New York and Cincinnati, has closed with the B. M. & J. F. Shanley Co., of Jersey City, a contract for laying its conduits in Harrison, N. J., and Kearney, N. J.

THE ELECTRIC APPLIANCE COMPANY, Chicago, telephone manufacturers and electrical supply dealers, have in press a most complete catalogue of telephone parts, including everything needed for overhauling and repairing standard telephones.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has recently practically doubled its manufacturing capacity by equipping its plant with considerable new machinery, among which are a number of drill presses, Brown & Sharpe full automatic screw machines, etc.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, of Chicago, reports among recent shipments, the following: Rathdrum, Idaho, one 100-line express; Herrington, Kan., two 200-line express; Copperstown, N. Dak., one 100-line express; Montpelier, O., one 100-line express; Coldwater, O., one 150-line express.

THE F. BISSELL COMPANY, Toledo, Ohio, has issued a sheet on one side of which is described its Angle Iron Cable Arms. These are made for 4, 6 and 8 cables. Dimensions, weight and prices are given. On the reverse side, Pole Ladders and Pole Seats are given attention. Price and description is given for each.

THE STANDARD VITRIFIED CONDUIT COMPANY, of 39-41 Cortlandt street, New York City, is broadening out and enlarging its business. Mr. B. S. Barnard, manager of the company, who is well known in the conduit business, reports that business is particularly lively at present and the best ever in the history of the company.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has been furnishing a full line of telephone equipment, including self-restoring drop express type switchboard, all embodying in the construction of the parts many improvements that are of vital importance to the durability as well as the efficiency of a telephone plant.

THE ERICSSON TELEPHONE COMPANY, 296 Broadway, New York City, has issued a little pamphlet descriptive of the various styles of switchboards which it manufactures. The pamphlet is tastefully arranged and artistically illustrated, giving views of some of the chief American and European central offices that the Ericsson Company has built. The title of the booklet is "At Your Service."

THE S. H. COUCH COMPANY, of 162 Pearl street, Boston, Mass., reports large sales on its Reliance transmitter. Quite a number of exchange managers are availing themselves of the opportunity to purchase one of these transmitters at the price offered. Owing to the large demand this price will soon be advanced. To any one interested the above company will gladly mail descriptive circular.

THE NATIONAL WIRE CORPORATION, of New Haven, Conn., announces that the opening of the season in the telephone wire line is unexpectedly good, the demand heavy, and their mills running night and day, making only high grade extra double galvanized wire. They have given up entirely the manufacture of the cheaper grades of galvanized wire, used for other purposes, devoting their entire production to the manufacture of EBB, BB, and "Steel" grades, made according to the specifications of the large telephone and telegraph companies. Their mill has been in operation nearly a year, and the business has increased so rapidly that the company is now one of the three largest manufacturers of this class of material in the United States. They fully expect the season of 1904 to equal, if not to lead, all others, in the amount of new telephone construction, and therefore expect higher prices will rule very soon.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR TRADE, for good real estate and part cash, a \$45,000.00 telephone property, earning 15 per cent. above running expenses. For particulars, address Box 148 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City, giving description and location of realties. 148

FOR SALE—200 LINE IMPERIAL SWITCHBOARD, 123 drops installed, in use for only fourteen months and as good as new. Address BLAKELY TELEPHONE COMPANY, Blakely, Ga. 153

FOR Sale.—A \$27,000 telephone property earning 24 per cent. above running expenses. For particulars, address Box 147 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 147

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich. 131

WANTED—Position as manager or assistant of telephone exchange of 200 or more subscribers. Over five years' experience in switchboard and construction work. Must be permanent. Address Box No. 86, Wellsburg, W. Va. 149

WANTED—City Foreman, competent to oversee trouble and light construction system, 2,000 subscribers, Central Energy. Address Box 145, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 145

POSITION wanted as superintendent or construction foreman. Write for particulars. Box 152, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 152

WANTED—An experienced telephone exchange manager. Must have thorough knowledge of common battery apparatus and be capable of handling an exchange of twelve or fifteen hundred subscribers. Address Box 150, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 150

During this rush season, when all kinds of coarse freight are going forward in immense quantities, Poles are very likely to be hung up, even after they are loaded.

We trace every order we receive until it is loaded and every car until you receive it.

Get our Prices and try us on the next carload.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

**PRODUCERS
AND
WHOLESALEERS**

We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

C. J. HUEBEL CO.

MENOMINEE, MICH.

YARDS:

MENOMINEE, - MICH.
NATHAN, - MICH.
STAGER, - MICH.
SWANSON, - MICH.

Producers and Wholesalers of

IDAHO CEDAR POLES

45 FEET AND LONGER

MICHIGAN WHITE CEDAR POLES

ALL LENGTHS

WE HAVE

25,000 POLES

CONCENTRATED

AT OUR

MENOMINEE YARD

A Pole Inquiry Deserves a Prompt Answer

and gets it from us. And when the quality and price of our Poles gets your order we ship promptly.

No Waiting, Writing, Wiring

but the poles when you expect them and as you ordered. And a saving of money to you. Write us now.

Sand Point Cedar Co.

SAND POINT, IDAHO

The Valentine-Clark Co.

*Beg to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**



INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

IT'S SO EASY TO TEST

With one of my special instruments.

The voltmeter coils are so wound that they have 100 ohms resistance for each 5 volts of scale. When making a resistance measurement by Ohm's law with the Volt-Ammeter one immediately knows how much to subtract for voltmeter resistance. The figure is not an inconvenient one.

*It is always a multiple
of 100 ohms.*

Easy, isn't it?

*Write us; we will tell you
more.*

They don't cost very much.



LOUIS M. PIGNOLET

Originator of the Voltmeter Habit

80 Cortlandt Street ... New York City

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

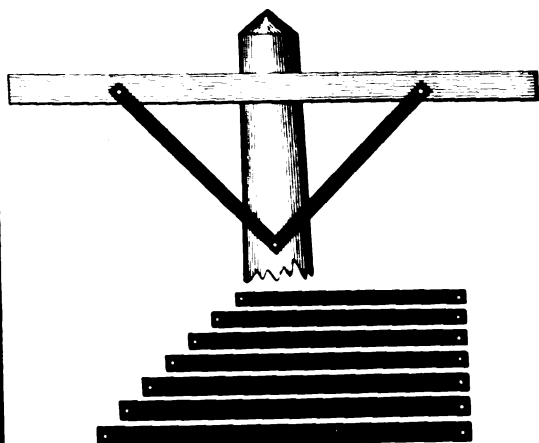
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN

JAPANNED

GALVANIZED.

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

IDAHO

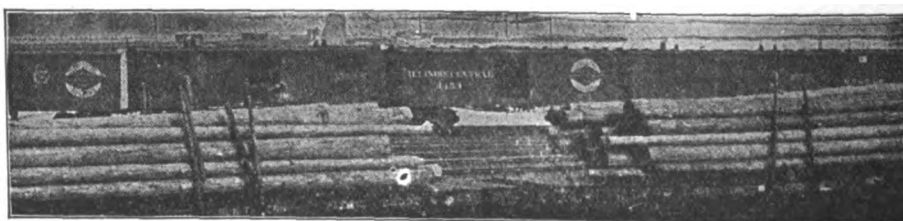
THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Juniper Poles

The Standard Pole & Tie Co.

550 Venezuela Building, New York

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. - MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you
Orders filled at once; no delays, no "cussing." TRANSPORTATION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. **ANTIGO, WIS.**

E. CHURCHILL

HERON, MONT.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.
LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES
YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W 22d St.
CHICAGO, ILL.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♣ ♣ ♣

Toll Tickets
Toll Station Journals
Toll Station Ledgers
Monthly Check Reports
Receipts for Toll Service
Receipts for Exchange Service
Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.


The Telephone Printing Company
DEFIANCE, OHIO



Do you always mention the

**American
Telephone
Journal**

when writing to advertisers?
It will be appreciated by all
concerned if you do.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR "II"**
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

**A Great
Educator**

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

**The American
Telephone Journal**

116 Nassau Street,
New York City.

Do you always mention the
American Telephone Journal
when writing to advertisers? It will be
appreciated by all concerned if you do.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

THE FAHNESTOCK TRANSMITTER COMPANY

Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ☛ ☛ ☛ ☛
74 CORTLANDT STREET, NEW YORK CITY

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.
Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,
**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

... Plans, Specifications and Estimates Promptly Furnished ...

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

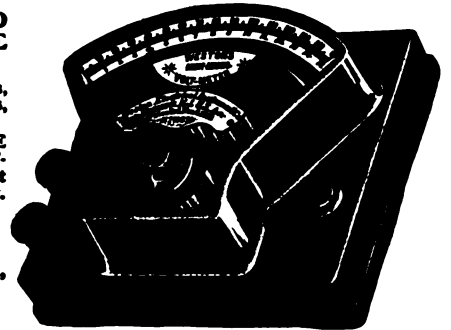
**WESTON STANDARD
PORTABLE**

DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Voltmeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,
WAVERLY PARK, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co.,
Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—E. H. Cadot, 12 Rue St. George.
New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers **THE OKONITE CO., Ltd.** 253 Broadway, N.Y.

WILLARD L. CANDEE, } Managers
H. DURANT CHEEVER }

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

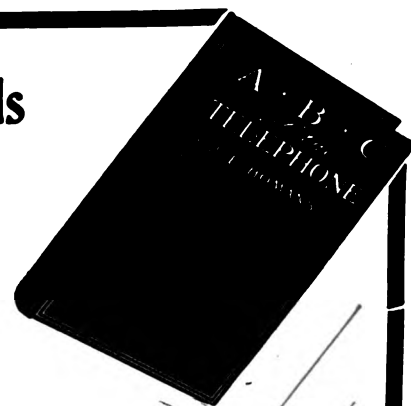
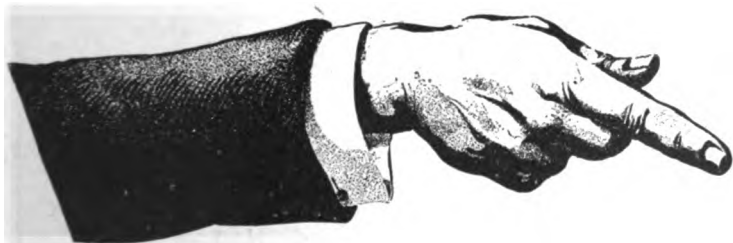
NEW HAVEN

SAN FRANCISCO

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____

State _____

American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.
3-19

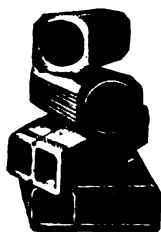
STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.
39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*



*Single or
Multiple Duct.*

**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

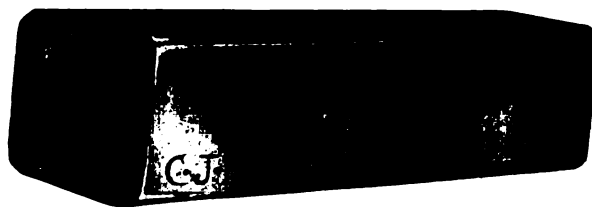
We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS



Large Factories in East and West.

Moderate Prices. Prompt Deliveries.

Tell us your requirements and we will submit samples and prices.

C. J. FIELD, - 29 Broadway, N. Y.
And 18 P. O. Square, Boston Mass.

F. B. BADT & Co., Monadnock Building, Chicago, Ill.
THE W. G. NAGEL ELECTRIC CO., Toledo, Ohio

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat lighter and more convenient to handle than Steam Pipe, and at much less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY:

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

170 Broadway, New York, N. Y.

822 Manhattan Bldg., Chicago, Ill.

Or to any of the offices of the WESTERN ELECTRIC COMPANY.

ADVERTISERS' DIRECTORY—Concluded

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.

Leslie, A. C., & Co. Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.



**Experience
is a wise teacher**

**We were taught in
that school.**

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

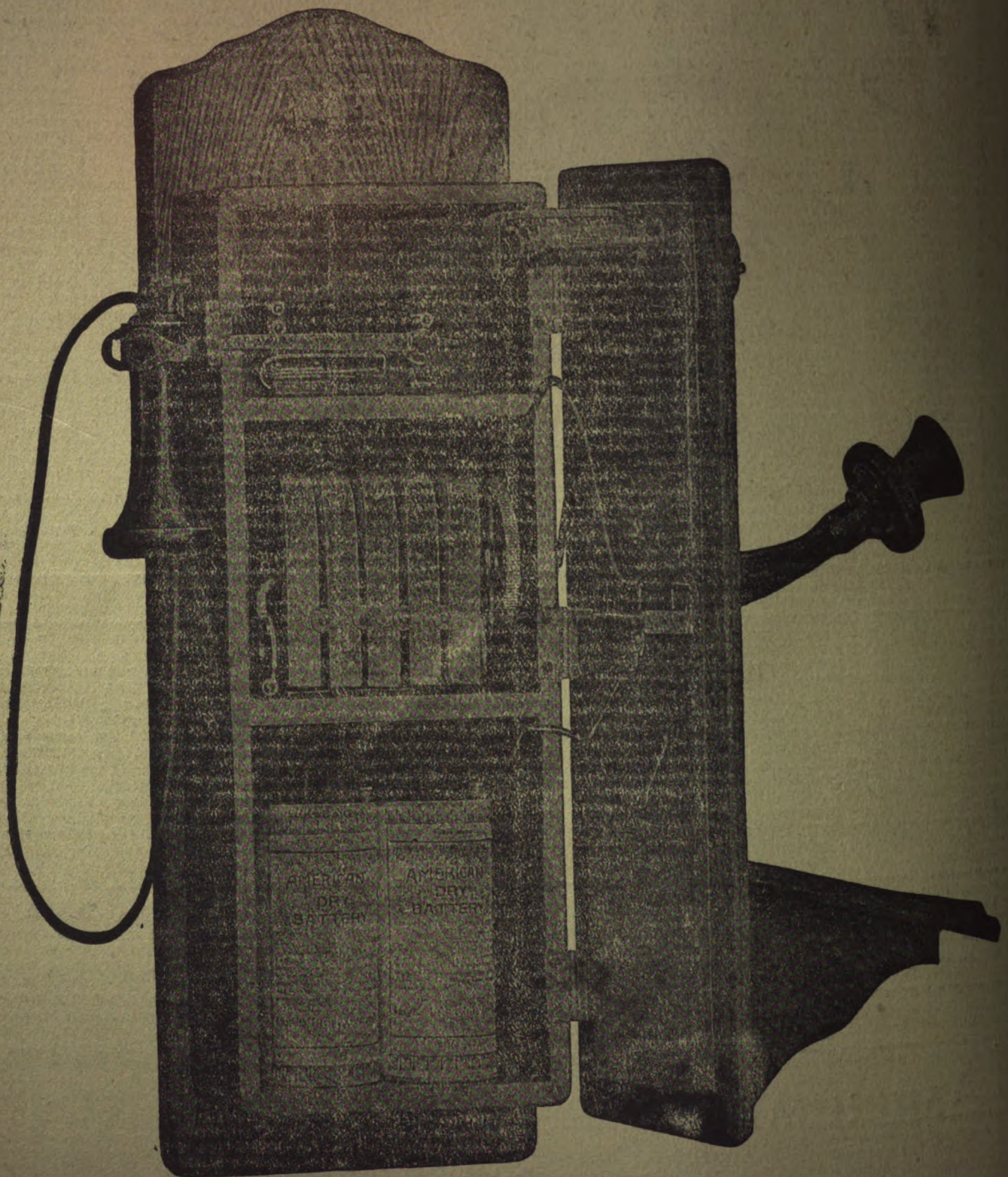
6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

The AMERICAN TELEPHONE JOURNAL

WORTHY OF THE NAME



No. 36 SAMSON



AMERICAN ELECTRIC TELEPHONE COMPANY,
CHICAGO, U. S. A.



THE AMERICAN TELEPHONE JOURNAL

Advertisers Who Buy Space

in the American Telephone Journal also buy **circulation**. It is circulation that counts, when it is paid. The Journal has a larger paid subscription list than all other telephone papers combined. That advertisers get results is shown by the following letter:

"The American Telephone Journal is the leading and most influential publication in the field. Experience has shown us that it is a very powerful factor in making new business with operators of telephone plants and also with manufacturers and supply dealers. We have on many occasions placed business with concerns that came to our notice through the Journal.

"STROMBERG-CARLSON TEL. MFG. CO.
Telephone Apparatus,
Chicago, Ill. Rochester, N. Y."

Such letters as this, 'prove that the Journal is the best advertising medium in the telephone field.'

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MARCH 26, 1904—CHICAGO Number 13

PUBLISHED WEEKLY

Contents, Page 2

ONE DOLLAR A YEAR

Advertisers' Directory, Page 9

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

THE HOLLYWOOD CALIFORNIA EXCHANGE.....By P. Kerr Higgins
TELEPHONE SYSTEMS: THEIR HAZARDS AND PROTECTION.....By R. A. Whittick
TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION—Installment IV.....By Frank P. Fowle
AN AUTOMATIC POLE CHANGER STARTER.....By C. S. Bundesman
LONG DISTANCE GERMAN SET.

The Operating Field:

REGARDING POSTMASTER PAYNE'S ORDER COMBINATION OF INDEPENDENT LONG DISTANCE LINES
EXECUTIVE COMMITTEE OF NEW YORK ASSOCIATION MEETS TWO-LINE SWITCHING DEVICE
NEWARK-NEW YORK COMPANY INCORPORATED CENTRAL UNION UNLOADS OHIO EXCHANGES
BELL TRIES TO BUY DEPOSIT, NEW YORK, COMPANY CUYAHOGA REPORTS SUBSTANTIAL INCREASE
MISSOURI RIVER TELEPHONE COMPANY INCORPORATED
QUERIES. THE EDITOR'S PAGE. PATENTS.
THE WEEK'S MESSAGES. TRADE NOTES.
WANT AND FOR SALE ADVERTISEMENTS, PAGE 208.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves,
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

New Haven
Novelty Machine Co.,
ELM AND STATE STS.,
NEW HAVEN, CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

SUCH ARE OUR FACILITIES

that the little as well as the big order has the same careful and immediate attention with the natural result—prompt shipments.

Our stock is the largest in the world and consists of high standard goods, which enable us on the every-day, ordinary shipments to meet the increasing demand for higher standards in construction.

TELEPHONE PARTS

including everything needed for the overhauling and repairing of standard telephones, are carried in Chicago stock, and illustrated and described in our special bulletin No. 21.

We manufacture a complete line of telephones in our own shops, and do not depend upon factories except for the raw material. Our Special Eaco Transmitter is a wonder, and those acquainted with it are the wiser and ahead by many years.

Our Noxem receivers are known from the Atlantic to the Pacific Ocean as the most proper type, with points of excellence which mean reduced maintenance cost to the exchange.

1900 Dry Batteries are still in the lead as the supreme par excellence in telephone batteries, giving a greater average life and of uniform results.

ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & c4 WEST VAN BUREN STREET.

CHICAGO

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

SUBSCRIPTION BLANK

Cut this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

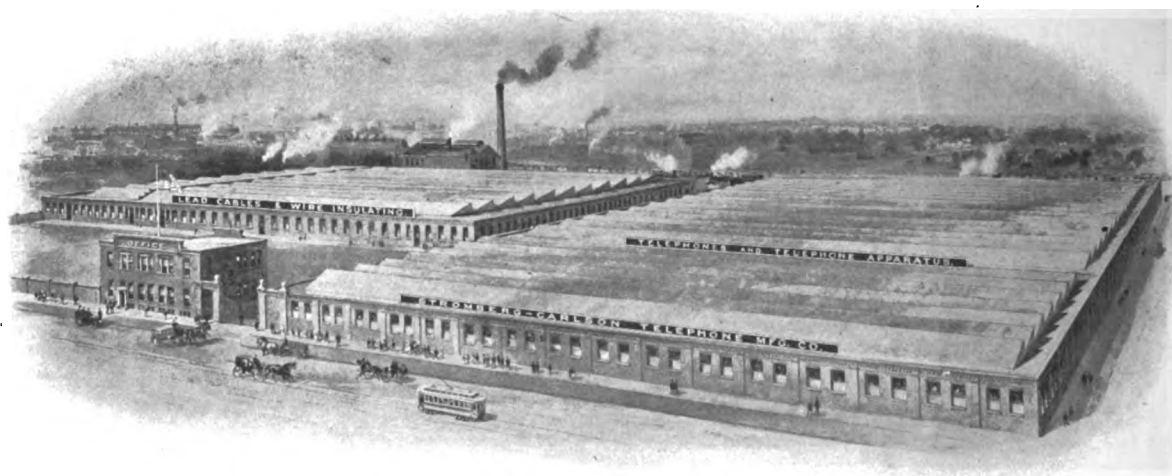
Name.....

P. O. Address.....

STROMBERG - CARLSON TELEPHONES

Are made TO MAKE MORE SALES

That's why they have built up the largest Independent telephone manufacturing establishment in the world.



OUR ROCHESTER, NEW YORK, FACTORY, 350,000 SQUARE FEET FLOOR SPACE

That means a good deal. It means the highest quality—lowest price consistent with the goods.

We have a new combination switching telephone for rural lines. It does away with knife switches or other cumbersome methods.

ASK FOR BOOKLET 30B

STROMBERG-CARLSON TELEPHONE MFG. CO.

Gen'l & Eastern Sales Office,

ROCHESTER, N. Y.

Sales Dept.,

CHICAGO, ILL.



CN 152

"The memory of quality lasts long after price has been forgotten."

You
Cannot
Outgrow a

Unit-Type Switchboard

Enlarged as growth demands

For particulars write to

THE NORTH ELECTRIC CO.

156-166 ST. CLAIR STREET, CLEVELAND, OHIO



IF WE SHOULD BE DRAWN INTO WAR

and internal revenue to meet expenses were imposed, how would they distinguish between a *necessity* and a *luxury* in the case an article that is both, like

THE PENDENT TELEPHONE?

But as we are not going to get tangled up in any war right away, you might as well be using the instrument that combines the best qualities of all other known telephones, and its own exclusive features, *extensive mobility, unrestricted adjustability, unobtrusiveness in disuse, perfect freedom from obstructions and cord entanglements*; and it is not expensive.

The Vought-Berger Company

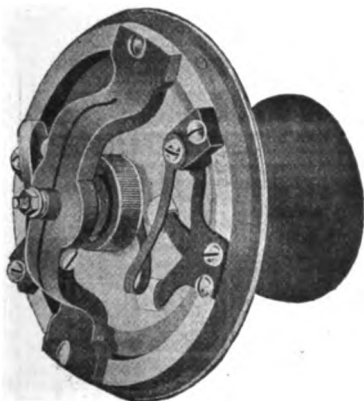
MAKERS OF FIRST-AWARD

Telephones, Switchboards and Appliances

LA CROSSE, WISCONSIN

THE CENTURY "Platinum Electrode" Transmitter

UNEQUALED
FOR
COMMON
BATTERY
AND
LONG
DISTANCE
SERVICE



Electrode
Surfaces
of
Pure
PLATI-
NUM

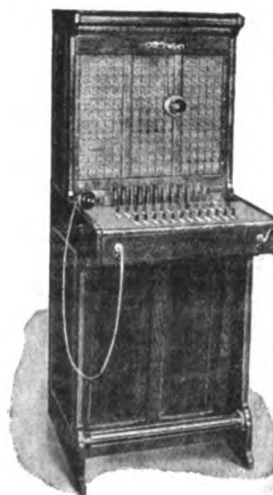
Body of Transmitter does not form any part of Circuit

Century Telephone Construction Co.

536 ELLICOTT SQUARE

BUFFALO, N. Y.

IT'S OUR BUSINESS to convince you that in our new type EXPRESS BOARD



*We have reached
the acme of*

*Electrical and
Mechanical
Perfection*

*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



SPRING IS HERE



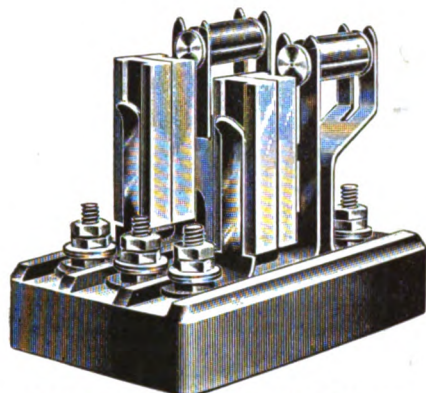
WITH ITS

STORMS

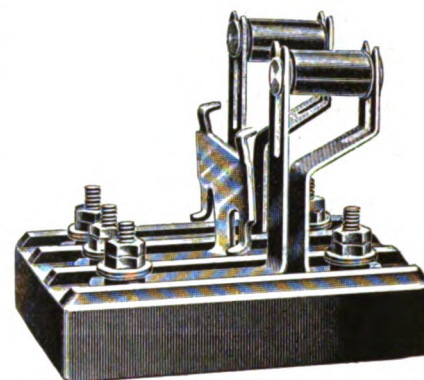
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 251 A.



Something New in a Protector for Telephones.
Order No. 251 B.

WRITE FOR PRICES.

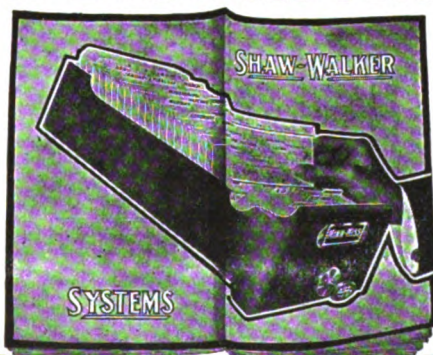
STERLING ELECTRIC CO.



LAFAYETTE, IND.



47 Systems for Business Men



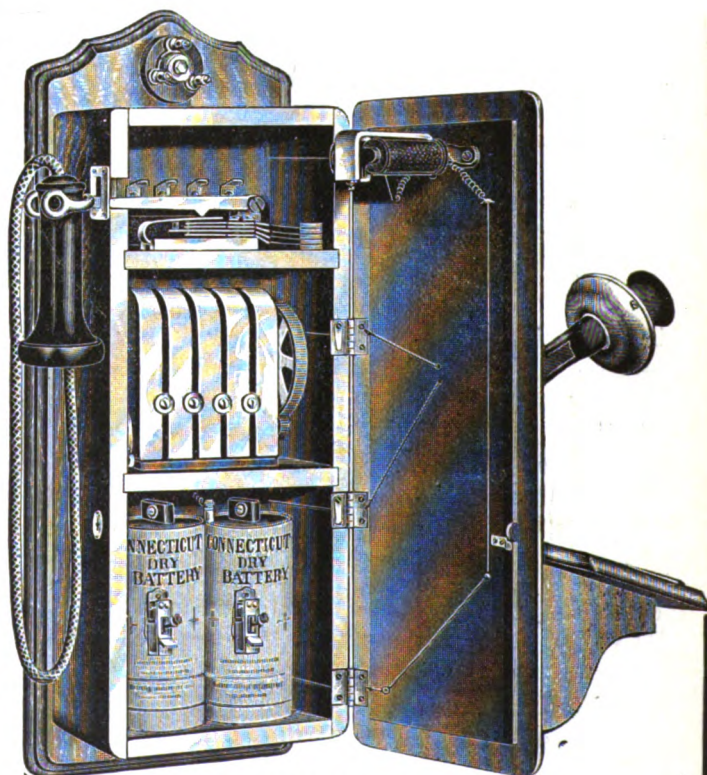
THIS BOOK IS FREE

It illustrates 47 different kinds of business that are successfully conducted by the use of Shaw-Walker card and filing systems. It tells you how to improve your office systems. How to save time, money and labor. How to increase the efficiency of your employees. How to decrease your pay roll. One hour invested in reading this catalogue will pay you large dividends during 1904. Send today for this valuable 58 page free catalogue.

THE SHAW-WALKER CO.

Branch at Chicago in the
Marquette Building

Muskegon, Michigan



Strongest and best Telephone on earth

The special quantity price will interest you

**CONNECTICUT TELEPHONE
AND ELECTRIC CO.**

MERIDEN, CONN., U. S. A.

Not Toys!
Not Experiments!!
Not Attempts!!!

BUT

**THE
PERFECT
INSTRUMENT**

**KELLOGG
TELEPHONE
APPARATUS**

Serenely Leads
the World!

Kellogg Switchboard and Supply Company
Green and Congress Streets, CHICAGO

Electric Building, CLEVELAND

Keystone Telephone Building, PHILADELPHIA



MONARCH COMPACT TYPE TELEPHONES

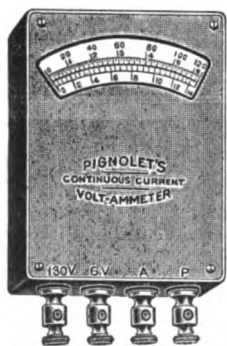
embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

**Write
Today**



**Our
Telephone
Cables**

400 PAIR
AND SMALLER

Need no introduction

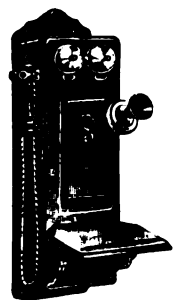
Let us quote on your Specifications

THE F. BISSELL COMPANY
TOLEDO, O.

Bulletin 226 on

WIRES
CORDAGE
STRANDS
and
CABLES

will be sent pre-
paid on request



Why Not Use THE BEST?

They last so much longer, wear so much better, and (in the end) cost so much less than the cheap and inferior grades.

ERICSSON TELEPHONES

are very durable, efficient and cheap to maintain :: :: ::

Applications for catalogs and estimates will have our prompt and careful attention :: :: ::



Ericsson Telephone Co.

"Strictly Independent"

Manufacturers of Switchboards, Telephones
and Telephone Supplies for Magneto
or Common Battery

296 BROADWAY NEW YORK, N. Y.

ADVERTISERS' DIRECTORY—Continued.

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>CONSTRUCTION TOOLS.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.</p> <p>COPPER.
Scovill Mfg. Co., Chicago, Ill.</p> <p>CORPORATION RECORD BOOKS.
Middleton & Co., J. W., Chicago, Ill.</p> <p>CORRESPONDENCE SCHOOL.
American School of Correspondence Chicago, Ill.</p> <p>CROSS ARM BRACES.
Inland Steel Co., Chicago, Ill.</p> | <p>CROSS ARMS.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.</p> <p>ENGINEERS AND CONTRACTORS.
Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.</p> <p>FILES.
Shaw-Walker Co., Muskegon, Mich.</p> <p>FUSES.
Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.</p> <p>GERMAN SILVER.
Scovill Mfg. Co., Chicago, Ill.</p> <p>GUY ANCHORS.
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.</p> <p>INSULATING MATERIAL.
Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburgh, Pa.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

CONTINUED ON PAGE 11.

The 1900 Dry Battery

THE most needed quality is reliability. No one wants a battery that will respond all right for a week or ten days then "suddenly go out of business." Another requirement is that it shall continue "strong" during its life. These two requirements besides many others are characteristics of

1900 BATTERIES

We guarantee them not to freeze, leak or break; we warrant them to work with a strong steady current during their life (anywhere from six to eighteen months).

They are compact, always ready. They are better than wet batteries—no slop, no repairs, no breakage. Any one can replace a worn out one at a moment's notice. They can be carried anywhere—always ready for instant use.

Write us for our Complete List of Batteries and Telephone Supplies

STROMBERG-CARLSON TELEPHONE MFG. CO.

General and Eastern Sales Office
ROCHESTER, N. Y.

Sales Dept.
CHICAGO, ILL.

8000 Automatic Telephones

...for...

Columbus, Ohio.

The Citizens' Telephone Company of that city will at once erect a new exchange building and discard the manual equipment of the central energy type which it is now operating. The order given us for 7000 stations has been increased to 8000.

Don't buy a new switchboard until you have personally inspected an Automatic Exchange.

...Manufactured by the...

**AUTOMATIC
ELECTRIC
COMPANY**
CHICAGO, U. S. A.

ADVERTISERS' DIRECTORY—Continued

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias, & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
North Electric Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

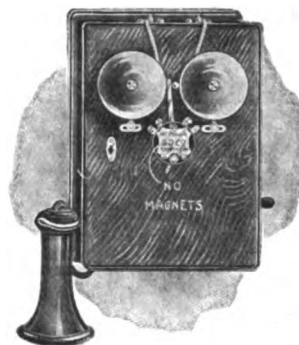
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Standard Pole & Tie Co., N. Y.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONCLUDED ON PAGE 37.



STOP TROUBLE

THE G.-D. DROP

THE only Telephone Extension circuit closer that has no magnets. Operated by bell clapper. Can't burn out. Nothing to get out of order. Not connected with telephone wiring. Simple. Durable. Cheap.

Send for special sample offer.
Ask for Pamphlet D6

GARTON-DANIELS CO., Keokuk, Iowa

Reliance Transmitter No. 90



For mounting on woodwork
or adjustable arms



The Button
(actual size)

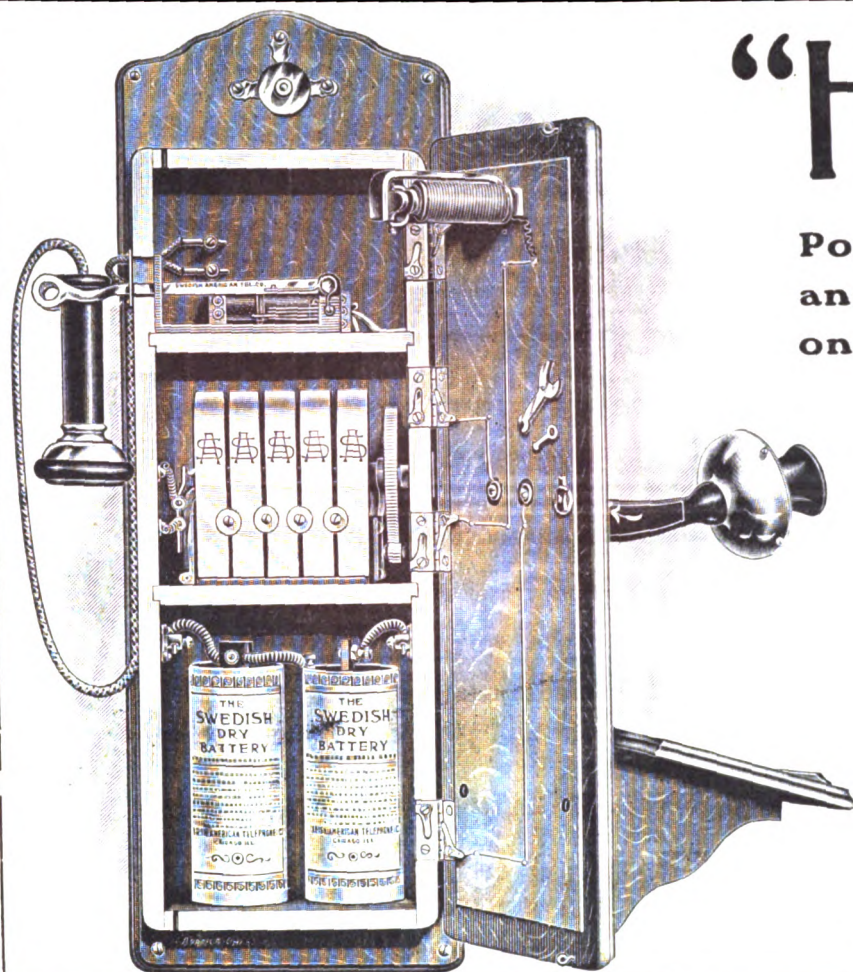
**ORDER ONE TO-DAY
SAMPLE PREPAID**

75 Cents.

S. H. COUCH CO.
162 PEARL ST. BOSTON, MASS.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,
116 NASSAU ST. CITY OF NEW YORK



"Hercules"

Positively the strongest
and most durable bridger
on the market.

100,000

IN DAILY USE

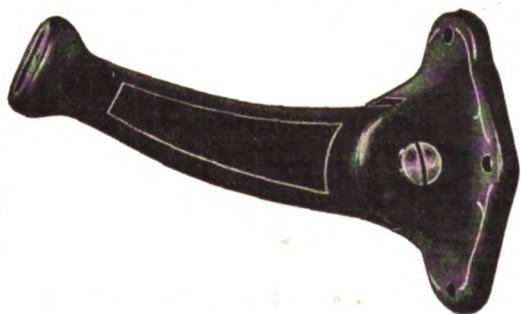
BECAUSE

*They are superior to others.
Give better service.
Cost less to maintain.
Ask us for catalogues and
prices.*

Swedish-American Tel. Co.
CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



SIGNS Point the Way

to better business.

Our business is to make the
better signs.

Our signs used by all progressive exchanges is good
evidence that they are the better kind.

Write us for designs and prices.
They will be cheerfully submitted.

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 103 Randolph St., Chicago, Ill.

Telephone
Wire



and
Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insula-
ted Wire and Cables

Aerial-Underground-Submarine
Lead Covered Cables

TERMINALS-STEEL STRAND-HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON.

NEW YORK.

PHILADELPHIA.

CHICAGO.

SAN FRANCISCO

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MARCH 26, 1904

NUMBER 13

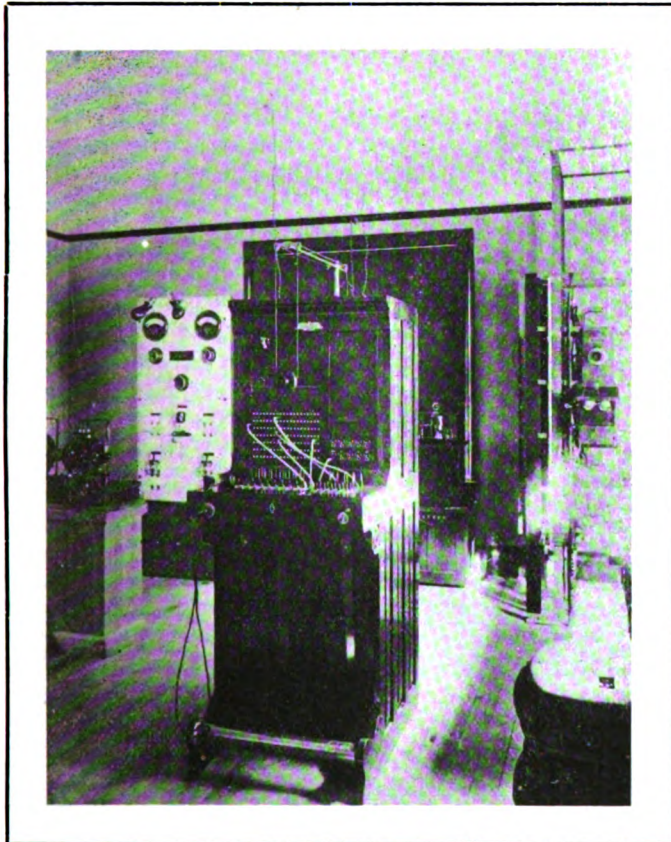
THE HOLLYWOOD, CALIFORNIA, EXCHANGE

By P. KERR HIGGINS.

THE Hollywood, Cal., exchange opened for business recently with 81 working lines and 20 unfilled orders. Since the opening ten more have been taken. The switchboard has a capacity (equipped) of 140 lines, ultimate capacity 300. There are ten trunk lines running to Los Angeles, a distance of six miles, and free service is given. Hollywood is the fashionable suburb of Los Angeles, and is about six miles northwest on the direct line to "Santa Monica by the Sea." It

switch is used. A Weston ammeter is provided with scale in 1-10 ampere divisions, and reads up to 10 amperes. A voltmeter is also provided reading up to 60 volts in 1 volt divisions. The accompanying photograph shows plainly the arrangement of the central energy switchboard, charging machines and the marble power board.

The board is equipped full central energy, with 10 local to local cords and five local to trunk cords, using No. 4 C repeating



Switchboard at Hollywood, Cal., 140 Lines Equipped, Showing Pole Changer, Charging Machines, Power Board and Main Terminal and Connecting Rack.



Exchange Building of the Independent Telephone Company at Hollywood, California. This Building is Built on the Spanish Mission Style, Which is Quite Prevalent in California. Cost, \$5,000.

has a population of 1,200; close to it are Sawtelle, Colegrove, Toluca, and Soldiers' Home to which lines are now being run. The rates in Hollywood are, for business, \$5.00 per month, residence, \$3.00. The system covers a radius of three miles and is well built, the future growth of this thriving city having been amply provided for.

The arrester and cross-connecting board is of the new Cook type and provides facility for opening the line for testing purposes. The machines for charging the accumulators are made by the Holtzer Cabot Electric Co. Type .02 $\frac{1}{4}$ h. p., 110 volts at 50 amperes on the power side, speed 1,500. On the generator side it is Type E, 1-6 h. p., 120 W., 30 volts and 4 amperes, speed 1,500. A white marble power board is provided with switches for all purposes. The Ward, Leonard Electric Co., over and under load

coils when necessary on the trunks. The building is two-story with stores on ground floor and a five room flat and switchboard room on the 2nd floor. The flat is occupied by the exchange manager's family. Standard work has been done throughout, on the outside the work standing out in strong contrast with that of the older company.

Much progress has been made in this section with the long distance lines. Twenty private branch exchanges, running from 10 to 125 lines, have been installed in Los Angeles lately, making a total of 52 in use, not one having been lost through dissatisfaction or any other cause. There are now in use at Los Angeles, over 9,000 main lines and nearly 12,000 instruments. The service remains good and people show their satisfaction and appreciation by paying their rentals promptly. The report for

last month showed 99 1/3 per cent. collections; this includes all business of every character. The raise in rates has not diminished the demand for service in any way and the construction department is still flooded with orders.

With the issue of a new and greatly enlarged directory which it has been preparing, the Home Telephone Co., of Los Angeles, reports that it is on a very lively and successful financial footing.

While but one-half of the orders for instruments had been executed at that time, the income for January paid all coupons, interest and expenses, leaving a net profit of \$10,000. More than 10,000 instruments have been connected, and the number will swell to the 16,000 mark within a few months, which speaks exceedingly well for the very progressive and up-to-date management of the new company.

TELEPHONE SYSTEMS: THEIR HAZARDS AND PROTECTION*

By R. A. WHITTICK.

THE underground method of distributing cables throughout a city has almost entirely replaced the former pole lines, which are now only used in the smallest towns, or by inferior telephone companies. The hazards of pole lines will be taken up when considering cross-country trunks. The class of trouble on the city and country pole line is practically the same, with the difference, however, that the lightning risk is much greater, and the chance of crosses much less on the latter than on the former. The wire tower, or its equivalent, which the overhead system of distribution from the exchange necessitates, is a serious menace, and records show it to be a constant source of heavy losses from fire starting in the concealed or inaccessible mass of incoming lines.

Long-distance trunk lines are even now frequently brought into a city on poles, the main reason therefor being a desire to avoid the destructive effects upon clear transmission of speech, which are coupled with the closely bunched wires in a long underground cable. The skill of the cable manufacturer in adapting his product to the needs of long distance transmission of articulate speech is rapidly hastening the day when it will no longer be regarded as so very undesirable to place an underground cable in the circuit with a long distance line, and the overhead work through the streets of cities will thereby be without even this excuse for its existence. The Pennsylvania Railroad is already considering the plan of constructing a conduit from Philadelphia to New York City, along its own right of way, as they deem the expense warranted in view of the safety from interruption to

service and reduced cost of maintenance. But in adopting the system of conduits and thus ridding ourselves of the hazards of overhead lines, we encounter a new source of trouble and damage to life and property, namely, that due to fire and explosion in the conduit. The main sources of trouble are as follows:

1. Explosions of gas contained in conduits and man-holes.

2. Generation of hazardous chemical compounds by the action of electrolysis.

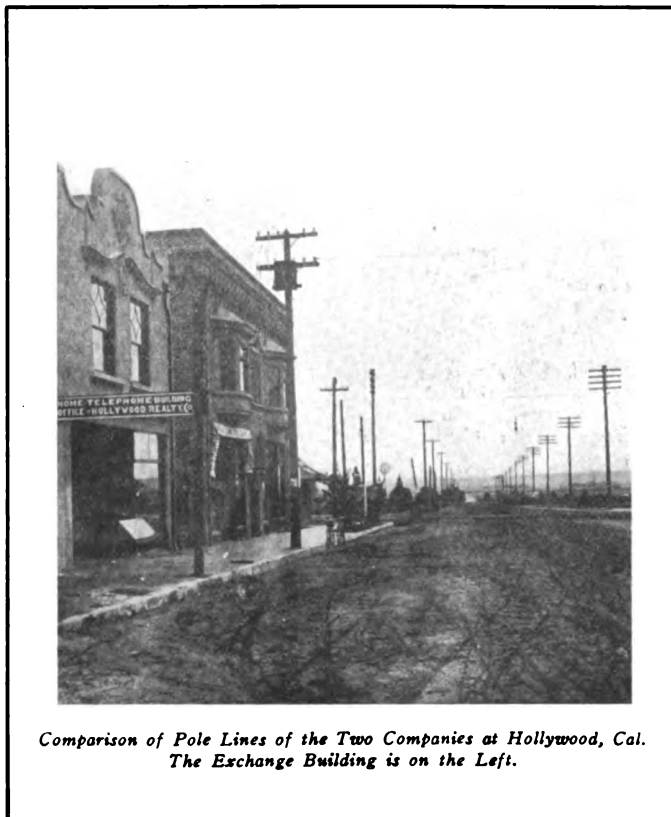
3. Combustion of conduit construction, such as creosoted woodwork.

The majority of cases result only in damage to the conduit system. The simple explosion of a conduit or a manhole ten or twenty feet from a building can hardly be conceived to imply destruction of that property by fire, even if the windows are shattered by the percussion. Our main concern is, therefore, with a direct communication between the conduit system and building, by reason of the lateral connection laid into the cellar thereof, or on account of the conduit structure being laid through a vault which has been found to extend too far into the street to allow of a detour being made. A hazard may

also exist where a lateral connection is provided to a wall-box, situated close against a frame building or fence in proximity to combustible material. A conduit system filled with explosive gases may cause a fire at a point several blocks removed from the place at which the first detonation occurs. A report says:

"Underground connections to wall boxes are made from main street conduit system, by laying one or more ducts. These ducts are of wood, terra cotta, iron pipe, or of fiber. In making this connection the duct is generally laid from the nearest manhole, and in as near a straight line as possible. An iron pipe is sometimes connected to the duct at this point, and carried through the cellar to the location of the terminal. This is in cases where it is deemed necessary to protect the cable from mechanical injury. The orifice of the duct in cellar is temporarily plugged to prevent articles being dropped in. After the cable has been pulled the space around it is cemented to exclude obnoxious odors. In laying a connection to box outside of building, a duct is laid from the manhole to a point under the box, and a bent section is connected and turned to face upwards and directly towards the box, above. This 'bend' is of iron, as its exposed position near the surface of ground makes it liable to severe blows, which render protective casing for the cable necessary.

"It is not uncommon to find more or less escape of gas from these connections, and in several cases illuminating gas has been found issuing in large



Comparison of Pole Lines of the Two Companies at Hollywood, Cal.
The Exchange Building is on the Left.

* This is an abstract of a paper read by Mr. Whittick before the Fire Insurance Society of Philadelphia, January 18, 1904. The author commences by a general description of the way in which telephone systems are at present installed, indicating briefly the methods of constructing lines both underground and aerial. He then shows that while a telephone system may, under some circumstances, be provocative of fire, the number and amount of injury traceable to this source in comparison with the number of telephones used, is so small as to become insignificant. He further says, that in a majority of cases, fires which have originated from telephone lines may be almost always traced to the deliberate omission of proper protective devices or to the employment of poor materials and poor workmanship in installation. He next considers the fire hazards which may arise from the use of underground conduits and gives valuable information respecting this feature.

quantities. A notification of the local gas company will generally result in prompt investigation and repair of leak. So far I have not learned of a case of fire resulting from these leaks, but I believe that a serious danger exists. I am, however, able to give typical instances of damage due to conduit connections into cellars:—"The gas from an underground conduit, which had caught fire and was burning underground, followed through the conduit connection into a coal bin under the sidewalk, adjoining a large building. The occupants noticed the odor and supposing it to be due to a leakage, notified the gas company and search was made. Their pipe was uncovered in the street, but no leak could be found. In the excavation the underground conduit was exposed, which was found to be smoldering. Upon following the conduit into the coal bin an odor very much like asphalt was noticed and considerable smoke was seen close to the building. This smoke was thereafter ignited by a gas jet which was burning in the cellar close to the coal bin and an explosion followed, which, however, resulted in small loss.—Case 450, Electrical Bureau Reports."

"Lead encased underground cables were laid in wooden conduits in the street and into the building. A new cable had recently been drawn into the conduit and it is supposed that it had rubbed against another cable and worn off the insulation. The current ignited the rubber insulation and wooden conduit and the conduit not being closed where it entered the basement allowed a dense smoke to pour into the building, damaging millinery to the extent of \$1,200.—Case 2,293, Electrical Bureau Reports."

We have demonstrations on our streets of the manner in which explosions travel along a conduit from one manhole to the next. There is no reason why damage may not be communicated to buildings through a closed vault or cellar. The great safeguard is prompt detection by tenants, for the presence of gas in manholes is generally undiscovered.

The question is, What is the most feasible method of relieving a conduit system of this inevitable collection of soil gases? and many inventions have been offered. The fundamental idea is perfect ventilation. Perforated covers to manholes, arranged in patterns to prevent street water from entering, have been tried. Vent-pipes from manholes to street curbs, thence up hollow iron trolley poles, or ornamental posts erected at the curb line, have been installed.

A plan, carried out in the telephone conduit system of New York City, seems to be the most beneficial, but I doubt whether the majority of companies could stand the contingent financial strain. It consists of placing an eight inch W. I. pipe parallel to and immediately under the conduit, which passes through each manhole along the route. A hole is tapped and vent pipe inserted, the orifice of which is fixed at the lowest, most obscure point of the manhole. A constant pressure of air is maintained in the pipe by means of fans at the exchange building, which results in a strong stream of air being supplied to the lower parts of the manhole in which the cover is removed for working therein, while a weaker circulation is maintained at all times. The expense of this plan, and the cost of maintenance is the prohibitive feature.

I have found vent pipes plugged with wood by workmen who find themselves slightly annoyed by the draft of air in their work. The dirt and dripping water in the majority of holes often closes the vents in a short time, and the ventilation is "declared off." Ventilation, while working in a manhole, is best obtained by means of a centrifugal blower, but this will not, of course, answer the purpose of relieving the system of gases at all times, which is the real necessity for safety from explosion. It may be said that no satisfactory solution of the problem of ventilating

conduits has been yet proposed. The next best point of attack is some plan to keep the gases out of the conduit. The difficulty in doing this may be readily appreciated.

The length of conduit in the city of Philadelphia, reported to December 31, 1903, as owned by the Independent Telephone Company was 1,138,000 linear feet, that owned by the Bell Company, 1,174,000 linear feet. Thus, as far as the linear feet of conduit, or, in other words, the length of trench opened through the streets, for the Bell Company to be about seven miles ahead of the new company.

We find matters reversed regarding the relative sizes of plant when we come to figure the "duct-feet" of the two systems, for although the Bell Company has 5,617,486 duct-feet, we find the Keystone Company controls 10,369,000, nearly twice as much.

When it is attempted to keep this vast mesh-work of tubes (to say nothing of other conduits in the city) free from gases, the task will prove to be practically impossible. The sewer gases which percolate through the ground and impregnate the subsoil of a city, necessitates that a structure be built which will be impervious at all points. This is impossible unless a continuous construction be perfected, such as concrete laid in trench as a monolithic system of tubes. Even the concrete will not keep the gas out. Reclaimed bitumen compounds have been proposed and tried in some forms, but have not met with success, although we expect the future will evolve some method by which a continuous, homogeneous mass may be laid in the streets, without joints, from manhole to manhole.

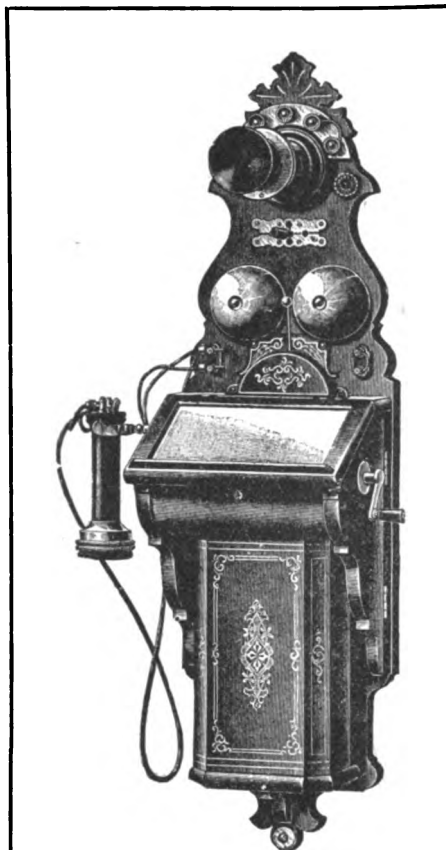
Gases arising from creosote and oils and greases used in pulling cable and preservation of wood used in construction of conduits, cannot be said to be serious.

The illuminating gas from street mains located parallel to or crossing a line of conduit, impregnate the soil and cause a gradual collection of same in adjoining conduits. The great source of gas in conduit systems is from pipes which from engineering reasons it has been found impossible to avoid in constructing manholes, and which as a consequence

have been allowed to remain in the completed structure. Unless great caution is taken to properly arch the brickwork of the walls over the pipe, a slight sinking of them will result in cracking or breaking the line, which will fill the system with gas.

Regarding the formation of hazardous chemical compounds by electrolytic action, I will quote from a Bulletin of the National Board of Fire Underwriters:

"For some time a slight smoke had been noticed issuing from the casing about the electric light wires in the basement, where they enter from the street. Inspectors arrived and removed casing. A peculiar substance had accumulated about the wires which, when moistened and struck with any hard substance, would give off flashes of fire. Woodwork around wires covered with thick liquid which had dried in places to a white substance resembling discolored salt; slippery to the touch and strongly corrosive. The wood itself was soft and strongly discolored. Analysis showed substance about the wires to be mainly metallic sodium; exceedingly combustible and uniting so readily with water that its presence in a damp cellar would be impossible under ordinary conditions. When it unites with water, hydrogen gas is given off and at the same time a considerable amount of heat is generated, which may be sufficient to ignite the hydrogen gas, which with air forms an explosive mixture. Hence a danger exists in the liability of an explosion. The explanation of the appearance of the metallic sodium about



LONG DISTANCE GERMAN SET.

This apparatus is one of German design to be used for "very long distance work," so the Germans tell us. The battery box is lined with sheet iron and provides for two sack batteries. Two extra terminals will be noticed between the bells and the desk on the right hand side. These are for an extra receiver provided the subscriber wishes one. The most conspicuous feature about the instrument is its bulkiness. They must have lots of room over there.

the wires is given as follows: Sodium hydrate existed in the cement mortar used in laying the brick wall upon which wires were supported, or the hydrate may have possibly worked its way through the wall from the cement used in paving the adjacent street. The presence of this hydrate about the wires caused deterioration of their insulating covering, with subsequent electrolytic action, which was increased by the conductivity of the sodium hydrate itself. The metallic sodium was undoubtedly the product of this electrolytic decomposition of impure sodium hydrate.

"This case is especially interesting in connection with several of the explosions which have occurred in underground conduits, usually attributed to a leak in the gas mains. The London papers have recently suggested that possibly metallic sodium may have caused these explosions."

I have not had the fortune to be personally familiar with any such case, and with the proper metallic return wires to points

of zero potential on the trolley system, such compounds would rarely, if ever, form, as electrolytic action is almost eliminated in a well maintained plant.

Regarding the combustion of the materials of which the conduit is constructed, it may be said that the risk of a fire of any moment is exceedingly remote. Moreover, the modern conduit is of non-combustible material. On the other hand, even the old large wooden conduits, which are now under the streets of this city, comprising 130 ducts, and measuring 4 by 5 feet, are too compact and inaccessible to necessary supply of oxygen to admit of a serious fire, not to bring into consideration the remote location of real estate.

TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION.*

BY FRANK W. FOWLE.

V.—DEDUCTION FROM FORMULAE OF SEC. 4 OF THE THEORY OF TRANSPPOSITION AND THE EXTENT TO WHICH TRANSPPOSITION NEUTRALIZES MUTUAL INTERFERENCE.

A TRANSPPOSITION may be defined in the case of a two-wire metallic circuit as a rotation of the circuit through 180 degrees, or what amounts to the same thing, interchanging the two wires in their relative positions.

For the case of metallic circuits, it is evident from equations (8) and (11) that a rotation of 180° or a transposition of a two-

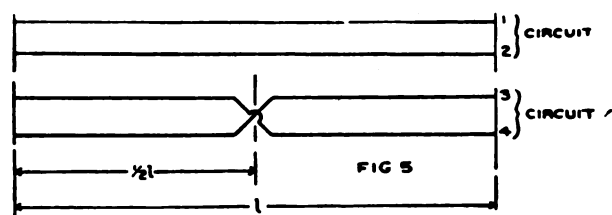


Fig. 5.

wire circuit changes the signs of the constants of mutual capacity and mutual inductance, that is, reverses the direction of the induced E. M. F. due to magnetic induction, and it reverses the direction of the induced charges and the currents due thereto, which are due to static induction. It is evident, therefore, that the location of a transposition at the proper point in one of two mutually inductive metallic circuits will cause the disturbances on one side of the transposition to be equal and opposite to the disturbances on the other side of the transposition and the resultant induced E. M. F. and the resultant induced current will be made to vanish.

It is evident, also, from equations (13) and (16), in the case of a single grounded aerial wire and an aerial metallic circuit, that a transposition of the metallic circuit will produce the same result.

An inspection of equations (18) and (21) shows, however, that in the case of two parallel aerial grounded wires, a transposition is an impossibility. This arises from the fact that an interchange of the positions of the two aerial grounded wires will have no effect in changing the constants of static and magnetic induction; and it will be seen, therefore, at once, that cross-talk and foreign induction in metallic lines may be eliminated; and in grounded lines, only where the grounded line is exposed to a metallic line and transpositions are inserted in the metallic line, it being impossible to transpose a grounded line.

It is not possible, in the case of mutually transposed lines, to make the mutual disturbance completely vanish in all cases. The diagram, Fig. 5, which is placed above on this page, will illustrate the reason for this. In Figure 5, 1 and 2 is to be considered as one metallic circuit, and 3 and 4 a second metallic circuit transposed at its middle point. If the current in 1 and 2 is constant throughout its entire length, irrespective of the manner in which it may change in actual magnitude from time to

time, however, the induced E. M. F. in wire 3, to the right of the transposition, will be equal and opposite to the induced E. M. F. in the wire 4, to the left of the transposition, assuming that the upper wire is 3 and the lower wire 4; consequently, the transposition causes the magnetically induced E. M. F. in 3 and 4 to vanish.

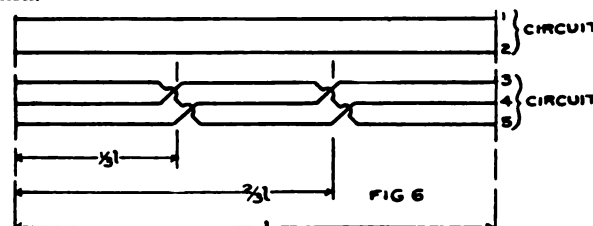


Fig. 6.

If the potential of circuit 1 and 2 is constant throughout its entire length, the induced charge on wire 3 will be equal and opposite for the part of wire 3 which is at the right of the transposition, to the charge induced on wire 4 to the left of the transposition; and, therefore, these two charges being equal and opposite, will merge through the transposition and vanish.

Each of these effects is modified if the length "l" of exposure is very great, the reason for this being that the potential along 1 and 2 is not constant, but gradually diminishes, due to the line drop in 1 and 2; and to the fact that the current in 1 and 2 is not constant along its entire length, due to the amount which is lost in charging the line; and the length "l" of exposure, must be made short enough so that the assumption of constant E. M. F. and the constant current throughout the length of exposure will be approximately true.

The case when terminal apparatus is connected to circuit 3 and 4, at the ends of the section of exposure, is slightly different from that given above, owing to the fact that part of the charge on wire 3 will pass through the terminal apparatus to wire 4 and vanish, the remainder of the charge on wire 3, on the right of the transposition, passing through the transposition and vanishing as above described. Of course, the current through the terminal apparatus connected with 3 and 4 may be made as small as desirable, by inserting a sufficient number of transpositions.

The insertion of a transposition in circuit 1 and 2, opposite to and at the same point as the transposition in circuit 3 and 4, will produce the same result as though neither circuit were transposed, as is evident from an inspection of the equations for the mutual capacity and the mutual inductance.

The transposition of a circuit containing more than two wires is accomplished as follows, and is shown in Figure 6:

This illustrates the exposure of a single metallic line to a three-wire metallic line, which may be considered as part of a three-wire distribution on the Edison system, or a three-phase transmission line, or a three-wire two-phase line. Two trans-

* Paper read at the annual convention of the Association of Railway Superintendents at New Orleans.

positions are necessary in this case, each exposure being one-third of the total length of exposure; and the transpositions in the three-wire line amount virtually to a revolution of the line through 120 degrees. The second transposition in the line represents a further revolution through an additional angle of 120 degrees. Thus the two-wire line is exposed to three consecutive sections of the three-wire line in such a manner that the total induced current and E. M. F. are made to vanish.

In general, the transposition of a circuit having " n " wires will require $(n-1)$ transpositions, the distance from one end of the section of exposure to the first transposition being $\frac{1}{n}$ th of the total length of exposure, and each successive transposition occurring at a regular interval of $\frac{1}{n}$ th of the total length of exposure.

VI.—TRANSPOSITION OF TELEPHONE LINES TO ELIMINATE CROSS-TALK. DERIVATION OF TYPES AND THE METHOD OF SECTIONS WITHIN WHICH ALL DISTURBANCES ARE MADE TO VANISH. THE UNIT OF TREATMENT IN ALL CASES.

Taking up now the matter of the transposition of telephone lines among themselves for the elimination of mutual disturbances between themselves, it is necessary to adopt a certain

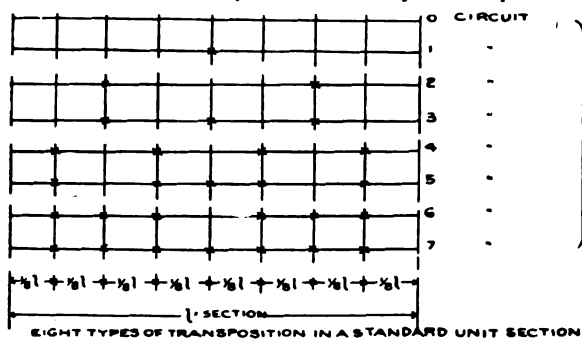


Fig. 7.

	0	1	2	3	4	5	6	7
0								
1	$\frac{1}{2}$							
2	$\frac{1}{4}$	$\frac{1}{4}$						
3	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$					
4	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$				
5	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{2}$			
6	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$		
7	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	

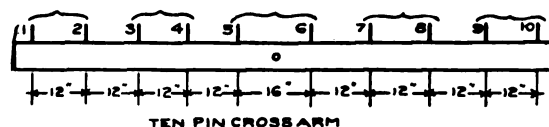
Fig. 7A. Actual exposures of Fig. 1.

standard length of section within which all the wires shall be transposed, as hereafter shown, and within which all of the mutual disturbances are made to vanish. The advantage of this is realized in securing a standard unit length to apply in transposing telephone lines carrying a large number of wires. The importance of this is seen when it is considered how complicated such systems may become, the complications consisting of the junction of two large trunk lines, the occurrence of intermediate offices, the bridging on of local stations and the insertion in the line of any such intermediate apparatus as may be desirable.

The procedure of transposing in such a case is to take the standard section, starting from one end of the line, and applying

it consecutively until next to the last section is reached, before some radical change in the line, such as the junction with another line, or the removal from the line or the termination of one or more or several pairs of wires, in which case the remainder, after taking the greatest number of standard sections, is, if less than half the length of a standard section, added to the preceding section, which is made a special section but transposed like a standard section, with longer lengths of exposure. If the remainder is greater than half the length of a standard section, it is made a special section and transposed like a standard section, the lengths of exposure being shorter than in a standard section.

Figure 7 shows the manner in which various types of transposed lines are derived. The particular case here treated is that of eight possible types, in which the type having the minimum number of transpositions is untransposed; the type having the maximum number of transpositions in the standard section



	1-2	3-4	5-6	7-8	9-10
1-2					
3-4	0.25				
5-6	0.30	0.21			
7-8	2.85	1.31	0.21		
9-10	4.95	2.85	0.30	0.25	

TABLE I

Theoretically permissible exposures for five circuits on a ten pin arm, based on an exposure of 1-2 to 3-4 of one-fourth mile. Tabular values in miles.

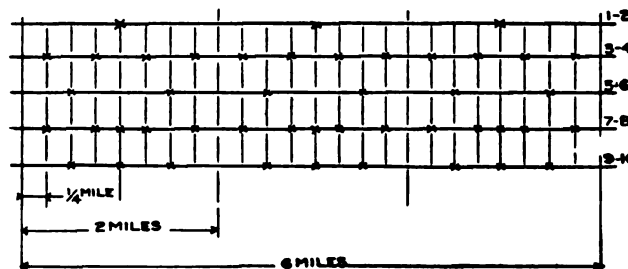


Fig. 8. A method of transposing ten wire lines, using two mile sections.

has seven. The method, however, as a general thing, may be extended to include as many types as are necessary. It will be noted that each type in the progressive development has one more transposition than the preceding. In the diagram the single line is taken as representing a metallic circuit and the crosses represent transpositions.

A convenient length to take for " 1 ," where the number of circuits does not exceed twenty or thirty, is between five and ten miles. The point is to adopt a length, in connection with the standard line span in use, such that the transpositions will fall at convenient places and that the shortest length between two consecutive transpositions will be an integral multiple of the standard pole span. The best standard of exposure between two adjacent horizontal circuits on a ten pin cross-arm, is one-quarter mile between transpositions. If two such adjacent circuits are transposed one-quarter mile from one of the terminals, and then at each consecutive half-mile, to the distant terminal, it will be found that with the standard of transmission now in general use, the cross-talk will be entirely negligible, and under normal conditions absolutely inapparent.

The manner of determining how often to transpose circuits which are not adjacent is as follows:

Calculate from equation (11) the mutual inductance between two adjacent circuits on the same cross-arm, and divide the result by 4, obtaining the mutual inductance for a parallel section of one-quarter mile. Then, to determine the permissible theoretical exposure between any two circuits in the line, calculate by equation (11) the mutual inductance for a parallelism of

one mile. Divide this result into the mutual inductance for the case first calculated, that of the parallelism between two adjacent circuits on the same arm exposed to each other for one-quarter mile. This will give the length of exposure between any two circuits, so that the mutual inductance will be equal to the mutual inductance of the standard for two adjacent circuits parallel for one-quarter mile.

It would have been equally logical to make the calculation on the basis of mutual capacity as given in formulæ (8), but it will be noticed that the numerator of the expression in No. 8 is of the same form as expression (11); and it will be noticed that the denominator of expression No. 8 depends only on the radii of the wires and the distance between two wires of a pair, both of these distances being constant for all pairs in the system. The second term in the denominator of No. 8 is very small compared with the first term, and may often be neglected.

A special case of a ten-wire line is herewith given, showing the permissible theoretical exposures on a quarter mile basis. The results are given in Table No. 1.

Figure 8 shows the application of the results in Table No. 1 and the method of Figure 7 to the transposition of a ten-wire line, showing several complete sections. The important point is

to so transpose the line as to fulfil the requirements of the table of theoretical exposures. There are many ways of accomplishing this, but in general the best way is that which employs the minimum number of transpositions which will fulfil the requirements.

The general rule, in applying a standard unit section to any line, is to make any discontinuity in the line the junction of two contiguous sections. A discontinuity is constituted by the junction with the line of other lines coming to the main line or leaving it and also a point at which the whole, or any part of the line, enters an intermediate or a terminal office.

The cross-talk between grounded aerial lines of considerable length will ordinarily be serious, and there is no means of transposition. It is possible, however, to lay out transposition points as before, and to insert grounded repeating coils or transformers at the supposititious transposition points. This is interesting only as a theoretical proposition, because it renders line maintenance a very difficult matter. The mutual induction between aerial grounded wires used for telegraphic purposes, where direct currents are employed, is slight and readily overcome by proper terminal apparatus.

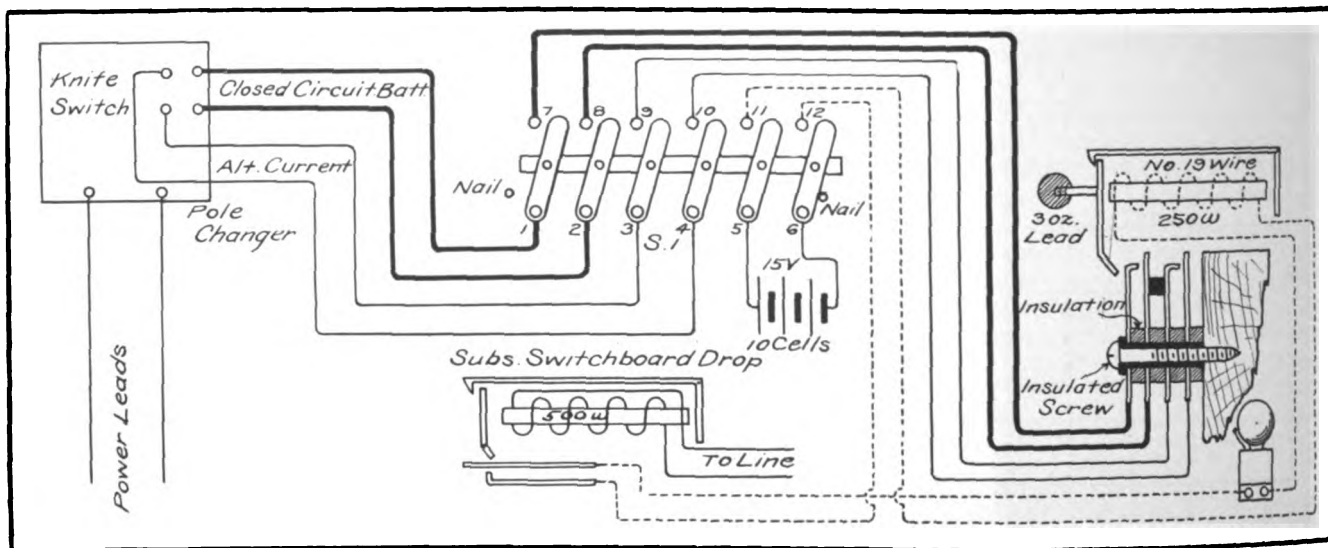
(To be continued.)

AN AUTOMATIC POLE CHANGER STARTER

By C. S. BUNDESMAN.

THERE are many advantages attending the use of an automatic starter for a pole changer which can be thrown in service at night when the calls are so few that it would not be economical to have the pole changer run continuously. As long as the pole changer runs there is an expensive drain on the closed circuit batteries.

operator can replace the fallen shutter without moving from the switchboard. When the night force is ready to assume duties the chief operator opens the pole changer knife switch and throws S_1 until the upper contacts are covered by the switch blades. This operation throws in the automatic starter and the night bell circuit at the same time. When a subscriber rings, this line drop



It has been found difficult to call party line subscribers whose signals are distinguished by long and short rings when using a hand generator to ring with. Where the pole changer does not run at night it is necessary to use the hand generator and there is trouble. Where the automatic starter is used this is avoided.

The automatic starter will soon save its cost in an exchange where the pole changer now runs all night, by the decrease in cost of battery renewals that it will make.

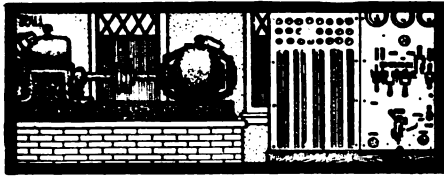
Most night operators, when a hand generator is used, have a tendency to slight their calls, because if the hand generator works a little hard the operator would rather not put the connections through than take the trouble to ring a second time.

The construction of a starter designed by the writer is so simple that any telephone man can easily make one. The figure shows the circuits used. A good six point switch is used. This is shown at S_1 . A good circuit closer is necessary. This may be made by the electrician himself. It should be mounted so that the

which is weighted with lead, will fall and close the contact springs beneath it, which will allow current in the night bell circuit to flow and ring the night bell. This current also goes through the relay or circuit closer and actuates it, closing the closed circuit battery and the alternating current circuits.

After calling the party wanted and ascertaining that he has responded, she replaces the shutter on the circuit closer to its normal position, thereby restoring all circuits to their usual conditions.

If a subscriber requests to be called at an early hour in the morning, the operator, in order to secure a ringing current, has simply to let down any drop on the board for a second. This will repeat the above, causing the pole changer to start. Replacing the shutter cuts out all of the circuits and makes the apparatus ready for new calls. Before leaving in the morning, the chief operator opens the switch S_1 and throws down the knife switch, leaving everything in condition to handle day calls.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



COMBINATION RINGING KEY.—(302).

Can you give me the circuit of a ringing key that will cut off the operator's telephone and answering cord when the called party is rung up? A. S. E.

All operators' cord circuits are so wired that when the calling cord is rung upon, all wiring back of it is cut off. In Fig. 302 is shown the general method of wiring the operator's cord circuit. If the ringing key is depressed, the contact between the normal springs and inner points is broken, so that all the wiring between this key and answering plug is cut off.

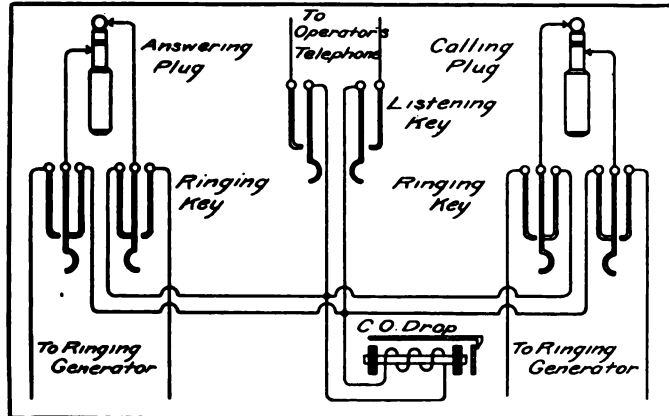


Figure 302.

When the answering plug is rung upon, the wiring is cut off between the inner points of the key and the calling plug.

FULLER CELL ZINCS.—(303).

Why is it that the majority of telephone companies use a zinc shaped like that shown at A (Fig. 303) in their Fuller cells rather than one as shown at B? A. B. O.

The type of zinc shown at A is best suited for use in a Fuller cell, because its form is bulky and concentrated, and being connected with the copper wire connector *a*, can feed down so as to always be in contact with the amalgamating mercury at the bottom of the porous cup. The form shown in B is wasteful, because a large portion of its surface would not be immersed in the exciting fluid. It cannot feed down, and therefore cannot remain in a condition of perfect amalgamation. The form is less simple than that shown at A, and therefore is slightly more costly.

covered with galvanized pipe. Birds carried straw into the pipe and the straw took fire melting the lead. T. N. S.

There are two methods which we can suggest to solve your question. The first, and the best one, would be to carry a cable downward at the poles on each side of the railroad crossing, and then take it underneath the track in a duct, which may be made of

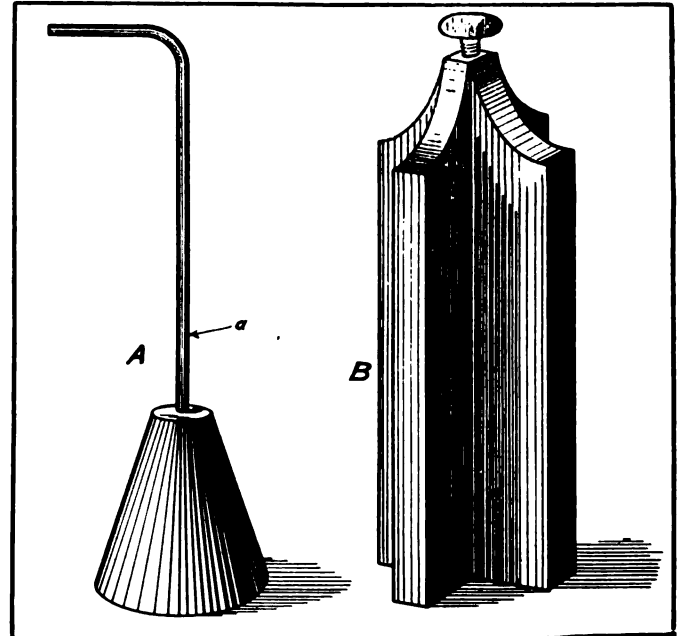


Figure 303.

pump log, iron pipe or vitrified clay duct. Another method would be to protect the cable as you have it by means of a galvanized iron pipe and stop the ends with iron screen in such a manner that the birds, which have proved such a serious annoyance, could not enter.

CONTACT POINT CLEARING SOLUTION.—(306).

Can you give me a solution to clean dust from contact points on switchboard jacks? I thought that there might be a solution which could be applied with a camel's hair brush without removing the jacks from the board.

F. N. O.

TO PREVENT UNREPLACED RECEIVER FROM INTERFERING.—(304).

If there was a $\frac{1}{2}$ condenser wired in the secondary of every telephone on a bridged party line with 1,600 ohm ringers, would it fully guard against the weakening of the line for ringing purposes when receivers were taken down? N. O. F.

While the addition of such a condenser would undoubtedly be somewhat effective in preventing the shunting action that you speak of, it might not entirely cure it, and therefore it would be likely to interfere considerably with transmission. If you have trouble from this source we would suggest that you place a push button in each instrument wired in such a manner (Fig. 304) that the local secondary is open except when the push button is pressed, and consequently when the subscriber talks it is necessary for him to operate the push button. The circuit is automatically opened as soon as the user leaves the telephone. It may be argued that subscribers would complain that such an addition was an annoyance, to which it may be replied that if the subscriber is careful to replace the receiver it would not be necessary to result to such an expedition.

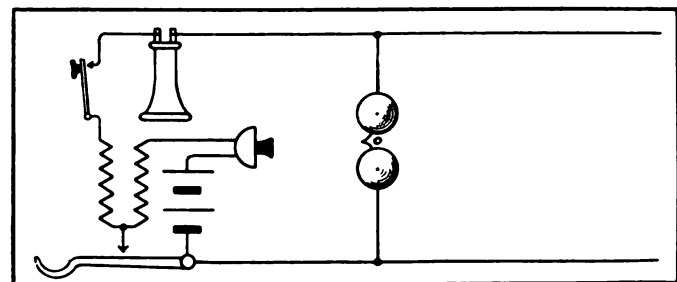


Figure 304.

There is no fluid that has been found desirable for the purpose of cleaning the contact points of series jacks. Many experiments in this direction have, in the past, been tried, and the only method which has proved to be uninjurious to the switchboard is to take a thin strip of watch spring or similar metal and poke it into the jack between the contact point and the spring, thus dislodging any dust that may have accumulated. The metal springs must be smooth and clean so as not to injure the contacts. It has been suggested that the watch spring have a few scratches made on either side, crosswise like a file. This will cut away any bad oxidation where the springs are used direct without platinum contacts.

CABLE OVER RAILROAD CROSSING.—(305).

What method of production do you advise for a cable over a railroad crossing where engines frequently stop directly under the cable. Hot cinders from the engines have punctured the lead casing. The cable was then



THIS OPINION
UNBIASED.

A CHICAGOAN'S
VIEW.

UNDER the caption, "They Are All Alike," the *Chicago Tribune*, in a recent editorial, severely criticizes the Bell telephone monopoly. THE AMERICAN TELEPHONE JOURNAL has from time to time quoted from that interesting and inspired source of information known as the *Boston News Bureau*. The opinion of so representative a lay newspaper as the *Tribune* may also prove interesting and instructive reading. In the case of the *Tribune*, of course the opinion is unbiased, except by righteous indignation at characteristic Bell methods. The editorial found its inspiration solely in the utter disregard for law evinced by the Bell concern, which has a monopoly of the telephone business in the city of Washington and District of Columbia.

Some years ago Congress enacted a law, prescribing more reasonable rates for telephone service within the District. The company refused to obey the law and, as Congress had failed to insert a penalty clause, continued to plunder the people with impunity. Now the house of representatives has inserted in the District of Columbia appropriation bill a provision reducing telephone rates and making the penalty of disobedience a forfeiture of the right to do business.

Commenting on this state of affairs, the *Tribune*, among other things, says:

"The American Telephone and Telegraph Company controls absolutely all the local companies with the exception of the so-called Independent concerns. The subsidiary companies earn a great deal of money for stockholders and especially for the central and controlling company, which is the largest stockholder. It is because the local organizations have to obey orders emanating from the same source that they resemble one another so closely in their methods. They all try to squeeze the last cent they can out of the communities they serve. They are all alike in their contempt of public sentiment and in their disregard of laws which aim to check their rapacity."

THE AMERICAN TELEPHONE JOURNAL heartily endorses this frank and truthful statement of Bell methods. The only exception that can possibly be taken lies in the head line, "They Are All Alike." The intention undoubtedly was to include all Bell companies in the same doubtful category. They certainly are very much alike, a fact to which every Independent company in the land will cheerfully bear witness.

These Independent companies themselves however, are an entirely different proposition. Of course, human nature is very much the same everywhere, although it might be contended that the Bell monopoly has more than its share of the article, and it is very human for a concern to wish to make as large a per cent. as possible on its capital stock. Still, from the very nature of things the Independent companies have been obliged to conduct themselves so as to win the respect and regard of the people. They are in reality much closer to the people than the allied Bell companies.

The Independent movement arose in the first place as a revolt of the people themselves from the extortions of Bell monopoly. The very fact that they are local companies, instead of in the control of eastern capitalists with no personal interest in the locality to be served, and only hearsay acquaintance with conditions, is indicative, not only of more intelligent and economical management, but of a closer relationship with the people and

greater regard for their needs and rights. This accounts in part for the remarkable spread of Independent telephony. But let the disinterested *Tribune* tell the story:

"Chicagoans will sympathize intelligently with Washington users of telephones. They themselves have suffered from poor service and high rates. They have seen their telephone company exacting higher rates than were permissible under the city ordinance, and compelling patrons who would not submit to robbery to go to the courts for slow and expensive relief. They have seen it resorting to every conceivable device to squeeze unearned nickels and dimes out of the community so as to maintain its dividend rate, while it was adding millions to its capitalization. Chicagoans hope that the Senate will concur with the House in the legislation regarding the Washington telephone company. When the license of the Chicago Telephone Company to do business expires five years hence and it asks for a renewal, the council should either refuse the request or else insert in the ordinance a provision that the penalty for a failure by the company to comply with any one of the conditions imposed on it shall be the forfeiture of its right to do business."

The experience of Chicago and Washington is typical of that in every part of the country where the Bell company has had a monopoly of the telephone business. They are indeed "all alike." But it is not often that the newspapers of the respective localities are willing to be so plain-spoken in the matter. When these things are considered it is not difficult to account for the tremendous growth of Independent telephony during the past ten years.

Smarting under a sense of wrong and exasperated at the utter indifference displayed as to the service rendered, the people have turned to the Independents for relief and they have not turned in vain. The lay press may not be aware that there are to-day more Independent telephones than there are Bell in use, but the Independent operator is decidedly alive to this encouraging state of affairs. He has invaded a territory which a mercenary monopoly had arrogantly appropriated as its own; he has put in the most modern equipment; he has asked for business on no other ground than that of superior service at reduced rates, and he has won the fight. Not only has the Independent movement been a great boon to the people, it is a noteworthy fact that the properly managed Independent company has made money.

As long as Independent telephony continues to be conducted along these lines, the movement will grow and capital will more and more seek investment in telephone securities. People as a rule are reasonable. They are not only willing but anxious that the telephone company which serves them shall make money, because only by so doing can equipment and service be maintained at high standard.

In maintaining this standard it is a primary principle of self-preservation that the Independent company should buy only of Independent manufacturers who have been tried and found not wanting. A different course would be manifestly so unwise that the statement seems almost axiomatic. No matter what its past record has been in relation to Independent companies, a concern like the Kellogg Switchboard and Supply Company, can not now expect the trade of Independents. A concern that is owned and controlled by the Bell people, in the interest of the Bell people, must have a poor opinion of the business sense of Independent telephone companies to even ask for business from that source.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

SALE OF FRANCHISE TO HIGHEST BIDDER.

IN an incorporated town in which there have been two telephone systems that have consolidated and are doing a regular telephone business, can the city aldermen sell the permit or franchise to a third party? If so, can the party buying the same compel the other party to move their poles and wires off the streets if the first party has no franchise? I send you a copy of the advertisement of the city council to give you more light on the subject.

IF the permit was granted in accordance with the act of April 9, 1895, sec. 1, it may not be valid because that act was declared unconstitutional. *State vs. West Side St. Ry. Co.*, 146 Mo., 155, 47 S. W., 959.

In the absence of statutory and charter provisions to the contrary, the city council has the right to sell a franchise to whom-ever it sees fit. It may do so even if there is already a telephone company doing business in the city.

Unless the franchise purchased by the latter company is exclusive and gives it the right to be the only telephone company operating in the city, the newer company cannot compel the older company to move its poles and wires off the streets. While the newer company would have no power to make the older company move its line from the streets, the city itself might do so unless the company is granted the right to use them by the State law. *Telephone Co. vs. Benton Harbor*, 121 Mich., 513.

Even if the franchise or permit of the newer company were in terms exclusive, that might not establish its right to make the older company move, for an exclusive grant of that character is not valid unless expressly authorized by the charter of municipality. Unless the city is expressly authorized by the legislature to grant an exclusive franchise, it cannot do so. *Joyce on Electric Law*, sec. 189. In Indiana the grant of an exclusive privilege to use the streets is invalid. *Crouder vs. Town of Sullivan*, 128 Ind., 486; 3 Am. El. Cas., 72.

CONTRACT DISABLING QUASI PUBLIC CORPORATION VOID.

THE suit of the Cumberland Telephone and Telegraph Company to restrain the city of Evansville, Ind., from interfering with the use of the streets by the complainant for telephone purposes has been decided adversely to the complainant by the United States Circuit Court for the District of Indiana. The complainant claimed the right to use the city streets by virtue of its purchase, from the Evansville Telephone Exchange, of its telephone plant and its right to operate said exchange in the city. The Evansville Telephone Exchange was granted, and accepted, the right to use the streets in 1882. In 1883 the Cumberland Company made its purchase, and since that time has been using the streets of the city for its business.

The answer of the city alleged that the attempted sale by the Evansville Telephone Exchange to the complainant of its property, rights and franchise was illegal and void because it was beyond the powers granted to the Exchange Company and also against public policy. It contended that the Cumberland Company therefore had no right to the property thus acquired and could not claim the protection of a court of equity for such property.

The court held that the powers of a corporation must be strictly construed and that it cannot exercise any power not expressly, or by necessary implication, conferred. Scrutinizing the statute under which the Evansville Telephone Exchange was incorporated, it decided that there was no power therein contained authorizing the corporation to sell all its property.

It held also that a contract by the Exchange Company that would prevent it from conducting the business for which it was organized, viz., the "establishing, maintaining, and operating" of telephone lines and exchanges, was void because against public policy. The principle of this holding is that a quasi public corporation cannot disable itself for the performance of its functions by the sale and transfer of its property without legislative authority.

On a petition for a re-hearing, the court affirmed its previous decision, and declared that the contract of transfer being void *ab initio*, the Cumberland Company acquired no shadow of a right thereunder. It denied the application for an injunction.

Cumberland Teleph. & Teleg. Co. vs. City of Evansville, 127 F., 187.

CROSSING RAILROADS IN NEW YORK.

WHAT is the law of New York in regard to telephone companies crossing railroads in both public and private rights-of-way? Is the consent of the R. R. Co. necessary?

I UNDERSTAND you to ask whether the consent of the railroad company is necessary before the telephone company can cross the railroad right of way (a) at a public highway; and (b) where there is no public highway.

In the State of New York the use of a public highway for the construction of a telephone line is an additional servitude and entitles the abutting owner to compensation. *Eels vs. Am. Teleph. & Teleg. Co.*, 143 N. Y., 133; 38 N. E., 202. His consent is necessary. At a point where a public highway crossed the right of way of a railroad company, the latter would occupy the position of abutting owner. Its consent would therefore be necessary before the telephone company could cross the railroad right of way.

The same rule would hold where there was no public crossing of the railroad right of way. The reasoning on which the rule is based is different, however, because the situation is analogous to the telephone company crossing the land of a private land owner.

In making the crossing in both cases the laws of the State in relation to the manner of making the crossing must be carried out and all the precautions therein provided complied with.

NEBRASKA STATE TAX LAW CONSTRUED.

IN the case of *State Ex rel. Breckenridge vs. Fleming*, Tax Commissioner, the Supreme Court of Nebraska construed sec. 78 of the tax law of that State. This section provides for the taxation of the tangible property of express, telegraph, and telephone companies, and in addition thereto for a tax upon the gross receipts of such companies for the year next preceding the first day of April in which the tax is levied. To this section the objection was made that it is the taxation of interstate commerce because the receipts of such companies arise greatly from the transaction of interstate business. The court answered this objection by saying that the presumption obtained that the legislature intended to pass a constitutional law, and therefore the gross receipts of these companies must be limited to include the gross receipts arising from business transacted within the State only. The court further said that the State board of equalization could prepare a schedule to meet this construction so that the law might be easily carried out.

State vs. Fleming (Neb.), 97 N. W., 1,063.



IN THE OPERATING FIELD.

REGARDING POSTMASTER PAYNE'S ORDER.

By E. H. HOPWOOD, *Special Correspondent.*

A DVICES from Washington telling of the serious illness of Postmaster General Payne, lend a different aspect to the fight which the Independent telephone interests of the country, headed by F. S. Dickson, of Cleveland, have been waging against the order to remove all Independent telephones from post-offices. It is reported that the Postmaster General is very sick, and that there is a strong probability that he may never be able to resume his work of directing the department.

It was reported recently in Independent telephone circles that the obnoxious order had been rescinded. This is not so. However, it is true that in the past few months no active steps have been taken to enforce it. To a large measure, at least in Ohio and the middle West, it has fallen into abeyance. The time has long since passed when the Cuyahoga telephones were to have been removed from the Cleveland post-office, but they are still there.

In spite of the fact that the order is in effect a dead letter, so far as the Cleveland field is concerned, those interested in the recalling of the order do not purpose to take any chances. At the recent convention of Ohio Independents, held at Cincinnati in February, a committee was appointed to make a personal visitation to the President and the Postmaster General to lay before them the manifest injustice of the order in discriminating against the Independents and practically turning over the government field to the Bell monopoly. It had been the intention of the committee to go to Washington last week, but then came the word of the Postmaster General's illness and the plan was perforce given up.

"It puts us up in the air just now," said F. S. Dickson, president of the Cuyahoga Telephone Co., of Cleveland, and a member of the committee. "The illness of the Postmaster General throws a new complication into the ring. Our trip has been postponed and may not be taken at all, unless the Postmaster General gets decidedly better."

There are several reasons why the Independents are not particularly worried over the order, although its strict enforcement would work havoc in their ranks. President Dickson, who has been leading the fight, is a man who can bring the influence of half a dozen powerful Senators to bear on the administration at Washington. The aid of a number of these men has already been solicited, and they have already said a word to the President. It is not believed that President Roosevelt would insist on an order which would be such powerful ammunition for his opponents on the eve of a great Presidential campaign. To enforce the Payne order, the friends of the President, admit will cost him thousands of votes.

Then there is the tempest that has been stirred up in the post-office department by the Bristow reports. That is likely to keep the department busy for a while. In the somewhat tense state of public sentiment it is not believed the public's attention will be called to the manifestly unfair Payne order, if it is possible to avoid doing so.

COMBINATION OF INDEPENDENT LONG DISTANCE LINES.

THERE was a meeting of representative Independent long distance telephone lines at Indianapolis, March 19. Among those who were present were: C. M. Forster, Charles H. Ledlie, Breckinridge Jones, W. D. Orthwein, August Gehner, W.

F. Nolker, Philip Stock, J. I. Drummond, Philip Scanlan, H. L. Reber, W. H. Bassett, E. B. Denison, W. R. McCanne, and W. D. Pittman, of St. Louis; J. D. Powers, J. A. Armstrong, A. L. Têtu and J. S. Brailey, of Louisville; F. S. Dickson, James B. Hoge, and Maxine Reber, of Cleveland; J. B. Splane, of Pittsburgh; Hugh Dougherty, of Bluffton, Ind.; F. Ramsey, Crawfordsville, Ind.; S. P. Sheerin, H. B. Sale, and Louis Hollweg, of Indianapolis. The object of the meeting was to complete arrangements for connecting the various Independent lines, East and West, and to make mutual agreement for the use of these various lines for long distance demand. Plans were made which will give the Independent lines connection between Philadelphia and Buffalo on the East, Topeka on the West, Texas on the South, and Minnesota on the North. At present there are several gaps, but they are all short, and little difficulty will be had in completing the connection. The only break between Indianapolis and the East, has been the stretch between Richmond, Ind., and Dayton, Ohio. This break is being rapidly closed. This will give the Independents connection from St. Louis to Philadelphia, Pittsburg, and Albany, New York. The St. Louis party consisted of fourteen stockholders of the Kinloch Telephone Company. The visitors were the guests of the New Long Distance Company, of Indianapolis, after the meeting, at a dinner at the Columbia Club.

To make this agreement operative the United States Telephone Co., which owns more than one-half of the long distance mileage represented in the conference, will have to build some extensions that will connect all the systems in the co-operative associations. A forty-mile extension will be constructed from Dayton, O., to Richmond, Ind., that will give the company a connection through to St. Louis. This connection will be completed and in working order before the Exposition begins. Another extension of about the same length will be built from Dennison to Cadiz, O., and to the Ohio River, giving an additional and better connection through to Wheeling and the coal territory there. A small gap between Erie and Buffalo will be filled and will give a connection to Albany and Philadelphia, while another gap from the State line west of Toledo to South Bend, Ind., will be constructed, giving a through wire to Chicago. Chicago has Independent lines projected to Milwaukee, St. Paul and Minneapolis, and others west of Omaha, so the Chicago connection will be one of the best made. A large business over the St. Louis wire is expected during the Exposition. St. Louis has a wire through to Kansas City, and others will be built to the Southwest, though the Kansas City and Colorado Springs wire leads down to Texas.

CENTRAL UNION UNLOADS OHIO EXCHANGES.

THE Central Union Telephone Company has just unloaded their exchanges in Georgetown and Ripley in Brown County, Ohio, and Augusta, Ky., through their local attorney, Mr. Bambach, to a local company, not a member of which is a practical telephone man. Brown County has but 225 Bell telephones, and most of these were installed by the Central Union, before their financial reverses, about three years ago, at ruinously low prices to shut out an Independent company that had applied for franchises.

The construction was cheap and now requires considerable money to place it in good condition, which, of course, is just what the Central Union Company desires.

Under the contract made with the local company, the Central Union receives \$2.00 annual rental for each telephone, and all

but a small percentage of the tolls, leaving nothing of value at their proposed \$12.00 rate.

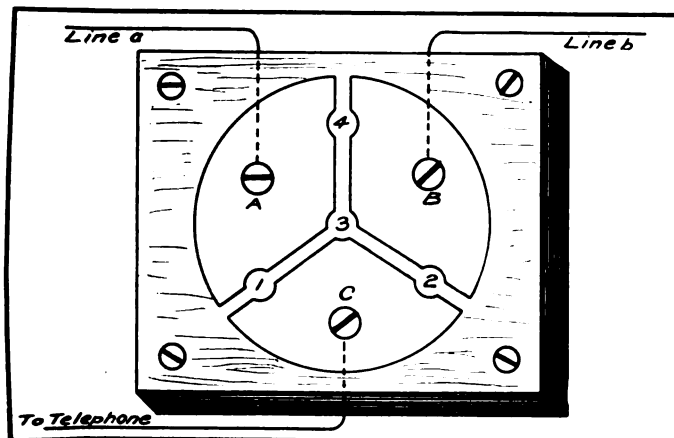
The local company is expected to build the non-remunerative farmer lines and turn over to the Bell Company the income from their only profitable business, the tolls and town exchanges, as interest on the cost of plants which they will be compelled to practically rebuild, and after such reconstruction *will own no part of same*. Brown County is surrounded by good Independent telephone companies which will organize an Independent company in that county. A comparative statement of conditions is:

	Independent.	Bell.
Clermont County has about.....	1,000 telephones	300
Clinton County, North, has about....	1,800 "	320
Highland Co., Northwest, has about..	550 "	380
Adams County, East, has about.....	300 "	300

TWO-LINE SWITCHING DEVICE.

By J. MILTON HALL.

THE drawing accompanying illustrates a simple and practical device for switching two grounded circuit lines, which I have found fully equal in efficiency to some of the more complex devices advertised by the supply houses. It consists of a trisected circular brass plate securely mounted on a base of fibre,



or other non-conducting material, and a brass plug with an insulating handle for completing the connections.

The incoming lines, *a* and *b*, terminate on the sectors *A* and *B*, being attached thereto by means of binding screws on the under side of the plate. The telephone is similarly attached to the remaining sector. The plug is normally inserted in hole *1*, thus connecting the telephone with line *a*. Line *b* is provided with an extension bell for receiving signals over that line. It is readily seen that connection can be made with line *b* with both lines, or that both lines may be joined and the instrument cut out of the circuit by inserting the plug in 2, 3 and 4, respectively.

EXECUTIVE COMMITTEE OF NEW YORK ASSOCIATION MEETS.

THE annual meeting of the executive committee of the New York State Independent Telephone Association was held in Syracuse last week. Representatives of nearly all of the largest operating companies were present, and a large amount of important business was transacted. The principal item of business was the hearing of the report of the special tariff committee appointed for establishing a general plan of handling the toll business of the State. A special committee was appointed for the purpose of establishing a clearing house in this State.

The officers of the association are George R. Fuller, of Rochester, president; Howard Hendrickson, of Albany, vice-president; J. H. Scofield, of New York, second vice-president; Joseph B. Ware, of Buffalo, secretary and treasurer. The executive committee, which is the acting committee of the association, is composed of George R. Fuller, of Rochester; Senator H. H. Persons, of Buffalo; B. G. Hubbell, of Buffalo; Edward Davis, of Philadelphia; S. B. Rawson, of Elyria, O.; T. Harvey Ferris, of Utica;

J. S. T. Edwards, of Johnstown; James S. Brailey, of Toledo, O.; and T. S. Lane, of Jamestown. The latter was elected secretary and treasurer to fill the vacancy caused by the resignation of Joseph B. Ware, who has accepted a position in the West. F. M. Potter, Jr., manager of the Syracuse Telephone Company, was elected to the executive committee in place of Mr. Ware.

It was decided to hold the next annual meeting at Buffalo under the auspices of the Frontier, the Interocean and the Consolidated Telephone Companies.

SIGNIFICANT INDEPENDENT CONVENTION AT EVANSVILLE, INDIANA.

By Telegraph from our Special Correspondent.

REPRESENTATIVES of Independent telephone systems in Kentucky and Indiana held an important convention on March 23d at Evansville, Ind. Toll and long distance rates between various connecting companies were adjusted on a basis satisfactory to all. Many new long distance connections were planned, which, when completed, will give the Independent companies absolute command of the long distance situation in Kentucky, Indiana and adjacent States. It was decided to organize a clearing house for the settlement of toll and long distance charges. The proceedings were held behind closed doors, with J. A. Armstrong, president of the Louisville Home Telephone Company and of the Kentucky Long Distance Telephone Company, as chairman. This convention, which was one of the most important gatherings held this year and will have a far-reaching effect on Independent interests all over the country, will inaugurate a general construction movement for new toll and long distance lines.

BELL TRIES TO BUY DEPOSIT, NEW YORK, COMPANY.

IN Deposit, New York, where the Susquehanna Valley Telephone Company has an exchange, the Bell Company has made an effort to gain a foothold and tried to get a connection with the local company. The directors were approached and asked to connect with the Bell system at Center Village, and said it (the Bell) would give the Independent company a good percentage of the proceeds from toll business. The Independent company has worked hard to build up a system and get the exchange to the place where it now stands, and they will not sell. In Deposit the local system is so satisfactory that over 100 of the leading citizens voluntarily have signed a written contract for service for ten years to come, which shows to the local company that they are appreciated.

MISSOURI RIVER TELEPHONE COMPANY INCORPORATED.

THE Missouri River Telephone Company has filed articles of incorporation with a capital of \$150,000, one-half of which has been paid in cash. The board of directors is composed of Walter S. Dickey, William F. Rankin, Frank S. Travis, John R. Stafford, and Ralph O. Stauber, who will serve for one year. The principal place of business of the company will be in St. Joseph, and the company will incorporate for a period of fifty years. It is practically a reorganization of the Northwest Missouri Telephone Company, which is now operating toll lines from St. Joseph to Tarkio, Missouri, and also several exchanges in that territory. The material has been ordered to build these lines with No. 10 copper and very heavy poles. The Western Independent Telephone Company has been contracted with for connection at St. Joseph.

CUYAHOGA REPORTS SUBSTANTIAL INCREASE.

MANAGER FRENCH, of the Cuyahoga Telephone Company, of Cleveland, Ohio, reports business coming in very rapidly since the installation of the new switchboard, although he has not yet put solicitors to work and the big campaign for new business has not started. It is estimated that the receipts of the Cuyahoga Telephone Company from unsolicited new business are increasing at the rate of \$700 a day gross. The campaign for new business will start in earnest on the 1st of April.

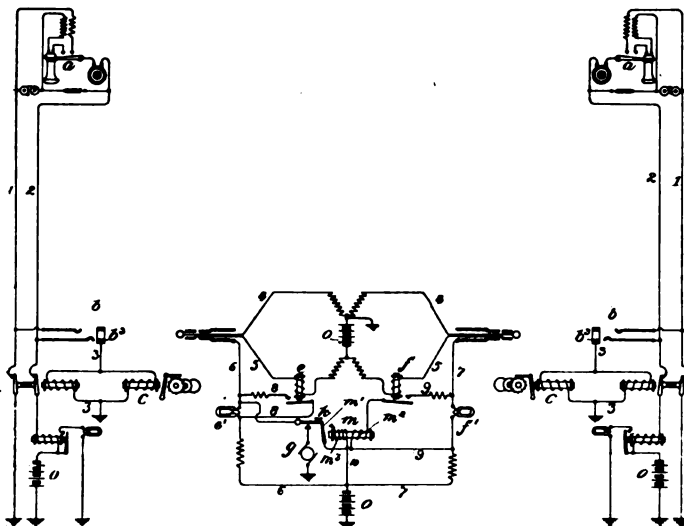
TELEPHONE



PATENTS

TELEPHONE REGISTER.

Frank R. McBerty, Evanston, Ill., patents (No. 753,903) an improvement in registering apparatus for subscribers' lines, and assigns to the Western Electric Company, of Chicago. This invention is illustrated in the figure. Mr. McBerty's invention consists in arranging an electro magnet to operate a counting mechanism recording the number of messages transmitted. The registering apparatus is under the control of the operator, who is supplied

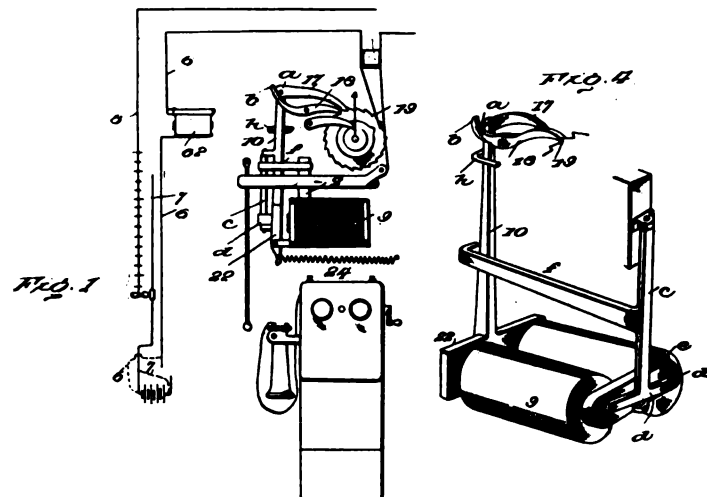


with a button controlling the circuit which operates the magnet, and finally this button is automatically locked so that unless the called subscriber answers the operator cannot register a call. In the drawing a and a' represent ordinary subscribers' stations connected to the central office by lines 1 and 2. These terminate in the usual bridging jack to the ring b , of which the cut-off relay and the magnet C , which actuates the counting mechanism, are joined in parallel. The usual cord circuit is shown, to which is added a source of current g of a higher potential than the battery O , also key k and the locking magnet m . The key k is associated with the answering plug. When this key is depressed it connects the free pole of the grounded generator G to the sleeve contact of the answering plug and excites the magnet C . The lock consists of the magnet m , provided with the armature m' normally locking the key k . When the magnet is excited the armature m' is withdrawn and the key may be depressed. The magnet m has two windings, m' and m'' , one of which is of low resistance and included in the shunt g to the supervisory signal f' . The other winding, m'' , is the unlocking coil, of high resistance—say, 200 ohms—connected in a local circuit, which is controlled by the front contact of the armature m' . The operation is as follows: Until the called party answers the supervisory f' remains lighted, but when the receiver is taken from the hook the relay f is excited, closes the shunt g ; as the winding m' is included in this shunt the magnet m is energized, the key unlocked and the operator can then, by touching the button k , register the call.

A SYNCHRONIZING SYSTEM.

H. Redmon, R. L. Hall and R. H. Conway, Cynthia, Ky., patent (No. 752,710) a means for synchronizing party line and telephone stations. This is a device intended to be applied to any system of selective party line signalling stations that are operated by any form of step by step mechanism, the object being to arrange a method whereby the step by step mechanisms at the various stations may be released and turned to zero in case any one gets out of order. The device is shown in Figs. 1 and 4. Fig. 1 is a general diagram of any form of step by step mechanism which is operated by a sliding contact at the central office, and consists in an electromagnet, g , which operates the lever 22 that

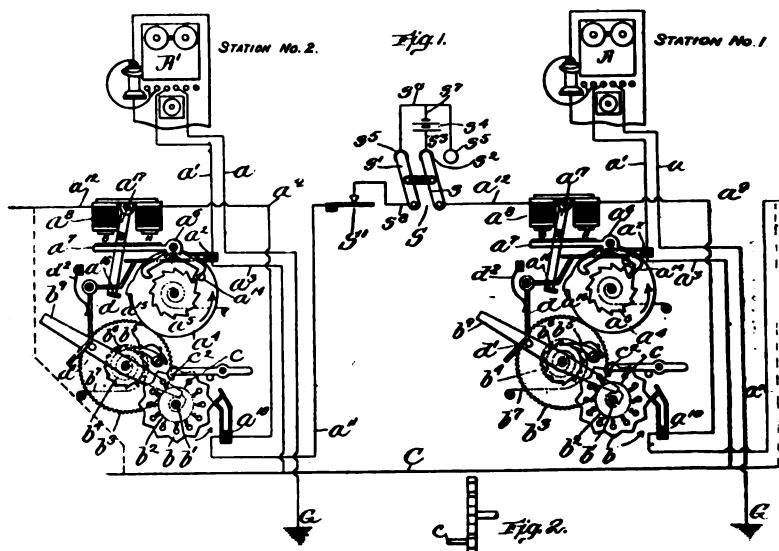
carries a ratchet, 17, that actuates the toothed wheel 19. The essential features of this invention are shown in Fig. 4, and are seen to consist of a permanent magnet, C , which is pivoted over the ringer magnet g . This magnet is provided with a bar, F , that is so arranged as to engage the lever 10. The end of the lever 10 carries a pin, A , which is arranged to trip the pawl 18. As



soon as the pawl is tripped the gear wheel 19 is released and can return to zero. Normally the permanent magnet is held in a certain position owing to its magnetism, but by reversing the current from the ringer magnets g , the permanent magnet carrying the arm F may be moved away from the arm 10, and in such a manner as to allow the pawl 18 to be tripped.

TELEPHONE SELECTIVE SIGNAL SYSTEM.

Robert Hamilton, Milton, Mass., patents (No. 753,067) an improved device for selective signalling for party lines. This invention relates to telephone systems where it is intended that each subscriber should signal any other subscriber with whom he wishes to converse without the intervention of the operator

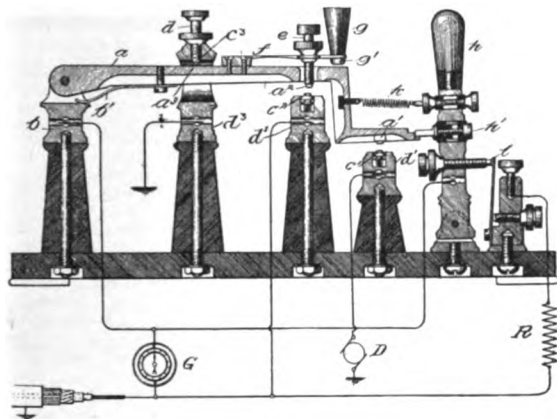


at central office. A patent Serial No. 142,286 was granted to Mr. Hamilton a short time since, and has been noticed in these columns. This patent embraces most of the features of the present one. The additional features of the one now under consideration embraces the ability to synchronize the step by step mechanism of all stations at any time from some desired point, such as a central office, and also means for replacing the selective mechan-

isms of the various stations in case any subscriber fails to hang up the receiver at the end of conversation. This patent is too complicated to describe in detail. The general features of the device are shown in the figure, and those interested are recommended to procure a copy of the full specification. The gist of the invention consists of an electromagnet, *A8*, which actuates an armature, *A7*, that by means of the escapement *A6* moves the ratchet wheel, *A5*, and whereby any station may be selected by sending over the line the proper number of pulsations.

IMPROVED KEY FOR CABLE TESTING.

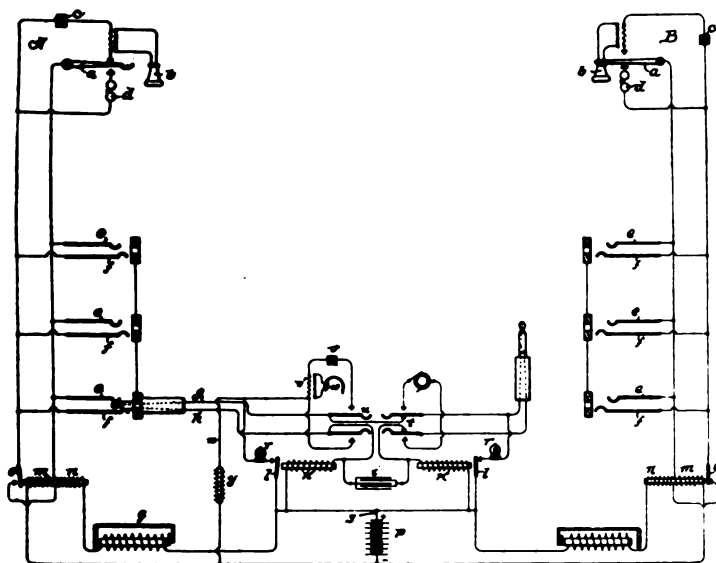
W. B. Hale, Chicago, Ill., patents (No. 752,158) and assigns to the Western Electric Company an improved key for cable testing. This key is shown in the figure. The inventor provides a main



insulated post *b* to which a lever *a* is connected. There are then three subordinate posts, *d1*, *d2* and *d3* carrying primary contacts, also a rocking lever post, *h*. It will be perceived that the key is arranged to provide a great number of different contact combinations which can be made available in any desired way in the electrical testing of cables.

MULTIPLE SWITCHBOARD SYSTEM.

W. M. Davis, Chicago, Ill., patents (No. 752,761) an improved common battery system, and assigns, by mesne assignment, to the Stromberg-Carlson Telephone Manufacturing Company. This invention is shown in the figure. The substations *A* and *B* are the ordinary subscribers' common battery station, which con-

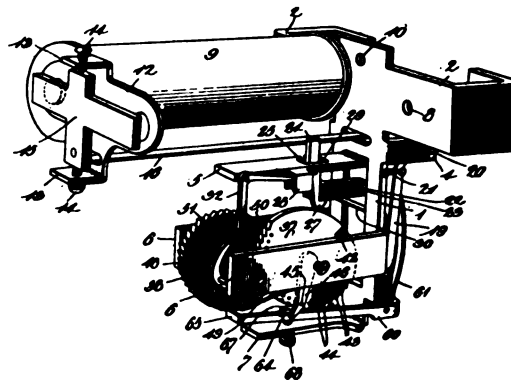


nect with the central office by a metallic circuit which ends in the spring jacks *E*. A differential relay, *Mn*, is provided. When the subscriber removes the telephone from the hook current flows from the signal *Q* through the differential relay out over the line and back to the battery. Under these circumstances the relay *Mn* does not attract the armature *O*, and consequently the signal

Q is displayed when the subscriber registers the call. When the plug *G* is inserted in the jack one winding of the relay *Mn* is shunted, the armature *O* attracted, and the relay operates as a cut-off relay. The supervisory signals *K* are placed in branches across the two sides of the cord circuit, which contain the condensers *I*. The circuit is so clearly presented that no difficulty will be found in tracing all of the functions performed.

AN IMPROVED TELEPHONE SIGNALLING DEVICE.

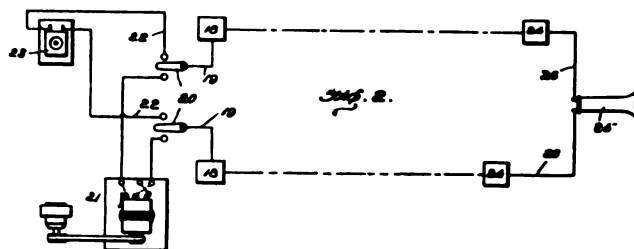
W. D. Watkins, San Jose, Cal., patents (No. 753,183) an improved telephone signalling device, and assigns to the Watkins Manufacturing Company, San Jose. The object of this invention is to provide a method of selective signalling for party lines so that only the bell of the subscriber desired shall be actuated, and collaterally an improved and novel method of supporting the ringer



magnets and other parts of the signalling system. Mr. Watkins' invention is so complicated that it is impractical to give an adequate description within the limits of these columns. The essential features are shown in the figure, in which *2* is a pressed frame of brass or other metal to which the ringer coils are attached, and which also supports the selecting mechanism. In this figure one of the coils is removed. The selecting mechanism consists of a step by step device, which is actuated by a ringer magnet. The current pulsations revolve the toothed wheels of all stations synchronously. By means of the peg *50* and lever *32* a stop *24* is raised that locks the clapper *16* in place, so that it cannot vibrate. The peg *50* is placed at different points in the selecting mechanism of each station, and consequently the bell of the station, which corresponds to the number of pulsations sent over the line, is the only one which can be rung.

WIRELESS SIGNALLING.

D. Drawbaugh, Eberly's Mills, Pa., patents (No. 752,533) a method for wireless telephony. Mr. Drawbaugh's invention is shown in the figure, in which *18* and *18* are two ground plates, which are operated at such a depth below the surface of the ground as to be



in a perfectly moist stratum. *22* and *22* are two switches which can be arranged to connect the plates *18* either with the transmitter *23* or with the magneto generator *21*. This constitutes the apparatus at the sending station. At the receiving station there is a receiver, *25*, connected by wires, *26*, to two ground plates, *24*, one of which, according to the inventor, is to be set about 50 feet nearer the sending station than the other. To operate this system the switches *20* are thrown to connect the plates *18* with the magneto generator for a few minutes, then the switches are thrown so as to connect the transmitter. Conversation can then be carried on between the sending and receiving stations.



THE WEEK'S MESSAGES

FINANCIAL

DES MOINES, IA.—The Mutual Telephone Company has increased its capital stock from \$40,000 to \$450,000 and it will now rebuild and improve its exchange.

SIoux CITY, IOWA.—The Sioux City Telephone Company has filed a mortgage to the Central Trust Company of Chicago, to cover a bond issue of \$500,000.

CLEARWATER, MINN.—The Clearwater Telephone Company has increased its capital stock from \$10,000 to \$25,000 and will extend its lines to Buffalo, Becker, and other points.

NORWOOD, MINN.—The directors of the Norwood-Young American Telephone Company have declared a dividend of 5 per cent.

PLATTSBURG, MO.—The Clinton County Mutual Telephone Co., has increased its capital stock from \$20,000 to \$50,000.

HAY SPRINGS, NEB.—The H. S. Alcove Telephone Company of Hay Springs, has been incorporated with a capital stock of \$25,000.

ROCHESTER, N. Y.—At a meeting of the directors of the Stromberg-Carlson Telephone Manufacturing Company, regular dividends of 1¼ per cent, on the preferred and 2½ per cent, on the common stock were declared payable April 1, 1904, to stockholders of record March 19, 1904.

BRYAN, OHIO.—The Bryan Telephone Company has increased its capital stock from \$40,000 to \$75,000.

NORTH BENTON, OHIO.—The North Benton-Deerfield Telephone Company of Mahoning County has increased its capital stock from \$1,000 to \$15,000. D. J. Miller is president.

FRANCHISES.

COEUR D'ALENE, IDAHO.—The Interstate Telephone Company has been granted a twenty-five year franchise.

MURPHYSBORO, ILL.—The Jackson County Telephone Company and the Farmers League and the Community Telephone Association have been granted local franchises.

NORTH SALEM, IND.—The Eel River Telephone Company, of Hendricks County has been granted a franchise to install a local exchange.

ARGENTINE, KAN.—The Home Telephone Company of Kansas City has applied for a franchise in this city.

CAPE GIRARDEAU, MO.—A. R. Ponder representing the Local Telephone Company has secured a franchise to install an exchange at Hayti.

HUMBOLDT, NEB.—The Humboldt Mutual Telephone Company has asked for a local franchise.

RAVENNA, NEB.—J. R. Adamson of Broken Row, has been granted a local telephone franchise.

BUTLER, N. J.—An ordinance granting a franchise to Chas. A. Wilson and J. D. Haggerty, of Sussex, N. J., for the purpose of installing a local telephone exchange has been passed on the first reading.

NEW BRUNSWICK, N. J.—Lawyer A. G. Anderson, representing the Northeastern Telephone and Telegraph Company of Philadelphia, appeared at a meeting recently of the Piscataway township committee, and applied for a franchise for the company to construct its lines through the township.

CANTON, OHIO.—The Starke County Telephone Company has applied for a franchise at Louisville.

NORWOOD, OHIO.—The City Council has granted a twenty-five year franchise to the Norwood City Telephone Company. The officers of the company are: Edw. V. Fitzpatrick, president; R. M. Brotherton, secretary and treasurer, and N. G. Weaver, manager.

DALLAS, TEXAS.—Messrs. Waterbury and Whitney have asked for a local independent franchise.

NEW BRAUNFELS, TEX.—The Independent Commercial Telephone Company has applied to the city council for a franchise to install a local exchange.

COMBINATIONS

LEROY, ILL.—Thos. Cleary, G. W. Payne, A. J. Kenan, Oscar Bonnett, partners under the name of LeRoy Telephone Company have sold to D. L. Parts, of LeRoy for \$10,000, the system of the LeRoy Telephone Company.

DURANT, IND. TER.—The Chickasaw-Choctaw Telephone Company has purchased the franchises of the Bukehito Telephone Company and will erect an exchange at Bukehito extending the long distance line east of Bennington, Huger and Antlers.

OWINGSVILLE, KY.—Henry Watson of Mt. Sterling has purchased the plant of the Owingsville Telephone Company and is planning to construct several new lines.

CANNON FALLS, MINN.—F. W. Schofield, J. D. Schofield, of this place, and Dr. Chas. Schofield, of Benson, have purchased all the stock of the Cannon Falls Telephone Company.

MELROSE, MINN.—L. Troutman, of Wabasha, has purchased the local telephone exchange from the Minnesota Telephone Company.

WAKEFIELD, NEB.—The Northeast Telephone Company is negotiating for the purchase of the Black Hill Telephone Company of Ponca.

TROY, N. Y.—The directors of the Rensselaer Telephone Company have organized the Commercial Union Telephone Company for the purpose of consolidating the Rensselaer Telephone Company of this city, Saratoga Telephone & Telegraph Company of Saratoga Springs, and the New Union Telephone Company of Glens Falls. The new company elected John T. Christie president; W. Levis Burke, secretary and Peter McCarthy, treasurer. The new company will make many additions to the local system, including additions to both switchboards and new lines. There will also be a great many new toll lines constructed by the new concern.

ABERDEEN, S. D.—W. C. Bickelkaupt of the Dakota Central Telephone Company, states that his company has acquired the Leby City system.

DE LEON, TEX.—J. Davis of Stephenville, has purchased the local telephone exchange from L. I. Stephens.

MOAB, UTAH.—J. N. Corbin, manager of the La Sal Mountain Telephone & Telegraph Company, has leased the Moab & Thompson line and has consolidated the two lines under one management.

ELECTIONS

LITTLE ROCK, ARK.—The telephone association of Independent telephone companies of northwest Arkansas, southwest Missouri and Indian Territory, held an interesting session at Gravette and elected officers for the ensuing year: S. H. Slaughter, president; W. T. Stahl, vice-president; W. D. Wasson, treasurer, and Mr. Comfort, secretary.

DUBUQUE, IA.—The Interstate Telephone Company has elected V. H. Stevens, of Dubuque, president; R. W. Gadson, of Dyersville, vice-president; C. M. Laxson, of Earlville, secretary and treasurer. J. H. Denkhoff, of Dversville, J. M. Dunn, of Earlville, J. J. Kam, of Eclader, director.

JORDAN, IA.—The Excelsior Telephone Company has elected the following officers: J. L. Brown, president; F. D. Harmon, vice-president; W. T. Boyd, secretary and treasurer.

SOUTH ENGLISH, IA.—The Mutual Telephone Company held a meeting here recently, and elected the following officers: John Gemmill, president; Geo. Horn, treasurer and Hoemer Wenger secretary.

TEHERAN, ILL.—The Teheran Telephone Company has elected the following officers: F. P. Bonham, president; Chas. Aldrich, secretary and treasurer; John C. Logan, director. The company voted for direct connection between the central offices at Teheran and Mason City.

ROCKFORD, ILL.—The Winnebago County Telephone Company has elected the following officers: B. E. Collins, president; C. F. Tritle, vice-president; H. S. Hicks, secretary; Cham Starr, treasurer and D. W. Barningham, manager. It was decided to put all earnings into additional construction.

BENTON, ILL.—The Tri-County Telephone Company at a meeting here recently effected a permanent Franklin County organization, and elected J. Marshall Jones, president; J. W. Gray, vice-president; T. A. Henson, secretary and Floyd Taylor, treasurer.

DANA, IND.—The Citizens' Telephone Company has reorganized and elected P. C. Wilson, president.

INDIANAPOLIS, IND.—At a meeting of stockholders of the New Telephone Company the following officers were elected: Louis C. Walker, president; John W. Bowlies, vice-president; I. D. Wiest, secretary and H. B. Sayo, treasurer. The lease of the properties of the New Telephone Company to the Indianapolis Telephone Company was authorized.

REDWOOD FALLS, MINN.—The Rural Telephone Company has elected the following officers: F. E. Davidson, president; O. T. Newhouse, vice-president; H. M. Ball, treasurer; Geo. L. Evans, secretary, and A. C. Miller, general manager. The company expects to make extensions during the coming summer.

CLARENCE, MO.—The New Telephone Company in the Bacon Chapel neighborhood, has elected the following officers: H. T. Moore, president; N. R. Taylor, vice-president; J. W. Minnick, Jr., secretary and treasurer. The line will connect with Clarence and Lentner.

BLUE SPRINGS, NEB.—The Gage County Independent Telephone Company has elected A. R. Morris, president; A. S. Reiff, vice-president; J. B. Graham, secretary and Dr. W. L. Albin, treasurer.

LOGAN, O.—The Logan Home Telephone Company has elected the following officers: W. J. Fledderjohann, president; John Wellman, vice-president; E. L. Van Gorder, secretary; Homer G. Hansel, treasurer; Edwin Fledderjohann, general manager. Several improvements are planned to be added in the spring.

DEADWOOD, S. D.—The New Home Telephone Company has elected the following officers: Frank D. Cooke, president and treasurer; C. E. Cooke, secretary and general manager.

PERSONAL

J. E. CARR will resign as manager of the Beloit Telephone Company of Beloit, Wis., on April 1st.

CHARLES P. PLATT, who formerly represented the Kellogg Switchboard & Supply Co. on the Pacific coast, has accepted the position of representative for the Automatic Electric Company of Chicago, to cover the same territory.

SAMUEL C. PLATT, formerly eastern representative of the Kellogg Switchboard & Supply Co., has accepted a position as Eastern representative for the Sterling Electric Company of La Fayette, Ind., and will have his offices at 346 Broadway, New York City.

HERBERT LAWS WEBB, Consulting Telephone Engineer, has moved from 8 Queen Anne's Gate, to larger quarters at 35 Old Queen street, Westminster, S. W., London, England, and is settled permanently at that address. Mr. Webb intends to carry on a general consulting practice.

FRANK L. BILLS, general manager of the Sioux City, Iowa, Telephone Company, recently took an outing trip to the Illinois river, where he owns a fine houseboat.

GEORGE A. FRENCH, manager of the Hartford, Conn., Telephone Company, has resigned, and will be succeeded by Emor A. Smith, the present wire chief.

W. H. SCOTT, superintendent of maintenance for the Independent telephone company at Paducah, Ky., has been made manager of the Independent telephone system at Houston, Texas, and has left Paducah to take charge.

E. W. ABBOTT, Manager of the Norwich, Conn., telephone exchange, of the Southern New England Telephone Company, will be transferred to New

Haven on April 1, and will be succeeded by C. J. Benjamin, of New Haven, formerly of Waterbury.

UNDERGROUND

CLARKSVILLE, TENN.—The Cumberland Telephone & Telegraph Company has been granted permission to put its wires in Clarksville underground.

LYNCHBURG, VA.—The Southern Bell Telephone Company has made a proposition to the city council to install an underground system.

MISCELLANEOUS

BOSTON, MASS.—A shrinkage of 7,442 instruments gross and 9,347, net is the story told by the instrument output statement of the American Telephone & Telegraph Company for the month of February. The gross output figures were 84,402, as against 91,844 a year ago and 95,584 in 1902; net output 47,309, as against 56,656 last year and 58,729 in 1902. This makes 3,880,616 instruments outstanding, as against 3,493,527 a year ago and 2,637,355 in 1902.



New Construction in the Field



LONGMONT, COLO.—The Farmers' Institute held a meeting recently at which T. C. Townsend, superintendent and manager of the Morgan County Telephone Company, W. S. Abbott, a telephone engineer of Greeley and C. F. Sellers, of Boulder, were present. Plans were discussed for a complete rural telephone system.

ELKHART, ILL.—The Elkhart Telephone Company is planning to extend its line southeast of Elkhart.

STREATOR, ILL.—The Independent Telephone Company of Streator is planning to spend \$15,000 on new city and farmer lines.

CAMBRIDGE, IA.—The Cambridge Independent Telephone Company will construct new lines this spring.

CLEMONS, IA.—The East Liberty Telephone Company and the Marshall Telephone Company will construct a toll line between Clemons and Marshall towns.

DORCHESTER, IA.—Farmers living in this vicinity have organized for the purpose of constructing a Rural Telephone line from Watkon to Dorchester and English Beach.

HAWARDEN, IA.—The Hawarden Telephone Company is planning to install an exchange at Sioux Centre.

LE MARS, IA.—The Le Mars Telephone Company is taking up the work of installing exchanges in surrounding towns and have constructed toll lines. The first town in which a switchboard will be installed will be at Struble.

NORTHWOOD, IA.—Albert Piper has taken a contract for the construction of a 20-station telephone line running southeast of town. He is figuring on several other lines.

SPIRIT LAKE, IA.—The local Telephone Exchange will be rebuilt by the Western Electric Telephone Company.

CONGERVILLE, ILL.—The farmers living north and west of this place are preparing to construct a telephone line to be known as the Hickers Point Telephone Line.

HEBRON, ILL.—Citizens are planning to organize a new company to take over the plant of the Citizens Telephone Company and if not to construct a local system. It will be capitalized at \$5,000.

DUNKIRK, IND.—The Citizens' Telephone Company has made contracts with all the Independent companies in the surrounding country for connection with their wires. Its switchboard which was built for 300 patrons will be enlarged. The telephone rentals will be the same price per month as heretofore. The following is the Board of Directors: N. G. Weaver, R. M. Brotherton, Charles H. Hersch, George Black, A. G. Lupton, Henry North-lane and Ed. V. Fitzpatrick. The officers are: Ed. V. Fitzpatrick, president; R. M. Brotherton, secretary and treasurer; N. G. Weaver, manager.

FAIRMOUNT, IND.—The Citizens Telephone Company will construct another trunk line from this city to Marion.

VERSAILLES, IND.—The Tanglewood Telephone Association will construct a line through Tanglewood to Versailles where it will connect with John Spencer's Telephone system.

NESS CITY, KAN.—A new up-to-date Telephone Exchange has just been installed here by the Home Telephone Company, of Ness City. Instruments to the number of seventy-five are already in working order, with many others to be put in as soon as possible. Ness City has good toll service with all of the surrounding towns. The managers of this company are much pleased with the success with which their recent efforts to give people a first class telephone service, has been received.

LARNED, KAN.—The leading business men and farmers of this county are talking of constructing a toll line from this city to Belfire, a distance of twenty miles.

PALMER, KAN.—Glenn-Hostutler of the Bank of Palmer, is promoting a Farmers' Rural Telephone Company to be operated in conjunction with the twin system; five lines are to be extended.

GREAT BEND, KAN.—H. E. Linds, manager of the Great Bend Telephone Company, has submitted a proposition to farmers to construct several rural telephone lines.

NEW MARKET, KY.—A farmers telephone line will be constructed from New Market to Marysville.

BOLTON, MASS.—Citizens of this place will vote on the question of establishing an Independent line from this place to Hudson.

SCITUATE, MASS.—The superintendent of construction of the Government Telephone Company in connection with the Life Saving Service, was here recently making a survey between the station of North Scituate and the one at Fourth Cliff. The intention is to build communicating lines along the south shore from station to station.

WEST BROOK, ME.—The Northeastern Telephone Company is preparing to extend its line from West Brook to South Windham and other towns.

GREENSBORO, N. C.—Subscribers of the Bell Telephone Company at a meeting recently, subscribed several thousand dollars' worth of stock towards a new Independent telephone system.

VALENTINE, NEB.—C. S. Reese of Valentine, is taking stock subscriptions for the purpose of constructing a telephone line from Valentine to Kennedy.

HAMBURG, N. Y.—A stock company will construct a telephone line this spring from Hamburg to Boston and Fowlerville.

NORTH WOLCOTT, N. Y.—Sylvester Brundige and Fred Brown will construct a telephone line from here to Wolcott.

BIG RUN, O.—The Big Run Telephone Company will construct a line to connect with the Beverly Telephone Exchange. The Centre Township Telephone Company, will also construct a line to connect with the Beverly Exchange from Reinersville.

GETTAWAY, O.—The Gettaway Telephone Company will construct a line to connect with the Mutual Telephone Company of Huntington, W. Va.

WEST MILTON, O.—The West Milton Home Telephone Company will install new exchanges at Laura and Englewood and make other improvements.

CRABTREE, PA.—Farmers in the vicinity of Crabtree have effected an organization and will apply for a State charter to construct a rural telephone system.

DELMONT, PA.—Doty Guthrie and other leading farmers of Dery County township, are arranging the construction of a farmers telephone system.

GERMIN, PA.—The Consolidated Telephone Company is figuring on installing a telephone fire alarm system in this place.

HERRICKVILLE, PA.—The lines of the People's Co-Operative Telephone System terminating here from the North and East, are nearly ready for the wire. The East Herrickville division reaches East Herrickville, Birney, Stephens Corners and Le Raysville. The Orwell division reaches South Hill, Orwell, Pattersonville and Chappers Corners where it connects with the Neath and Jackson Valley divisions, making nearly 50 miles of line all ready in use. Construction and equipment will be first class and done under the supervision of Engineer H. G. Newall, of Orwell, who is general secretary and purchasing agent.

LAWRENCEVILLE, PA.—The Lawrenceville and Tioga Telephone and Telegraph Company is planning the extension of its services.

ABERDEEN, S. DAK.—J. L. W. Zeitlow, president of the Dakota Central Telephone Company was in Mitchell recently planning to construct a new line to this city.

CANTON, S. DAK.—W. H. Wasen and others will construct a local and rural telephone system for the north end of Lincoln County.

VOLGA, S. DAK.—The Lake Sinai Farmers' Mutual Telephone Company is planning the extension of its lines this spring, and will rebuild the local plant.

FILLMORE CITY, UTAH.—Thos. C. Callister and Jas. A. Kelly, who purchased the telegraph line south of Jnab and north of Kanosh and turned it into a telephone line, are making preparations for the extension of their line to Oasis, Deseret, Hinckley and Abraham.

MEHERRIN, VA.—At a meeting of the Lunenburg Telephone Company held here it was decided to construct a line from Lunenburg Court House to Blackstone at once.

MONTPELIER, VA.—The stockholders of the Merchants' and Farmers' Telephone Company met here recently and decided to construct a line from this place to Richmond.

MIDDLEBURY, VT.—The Addison County Telephone Company is making new preparations to extend lines into Cornwall and Whiting.

INDEPENDENTS PRACTICALLY ENTER CINCINNATI.

THE Independent telephone interests who have been endeavoring to secure an entrance into Cincinnati, Ohio, for several years, effected an unexpected coup recently when they succeeded in having an ordinance passed by the Norwood City Council granting a franchise for twenty-five years. The immediate effect of this move is that Independent lines associated with the various long distance lines that traverse the State, expect by means of the Norwood franchise to approach directly to the limits of Cincinnati and have thus anticipated the expected annexation of Norwood within the next few years, which, according to some legal authorities, will make the Norwood franchise operative in Cincinnati.

BOOK NOTICES

Any book herein reviewed will be sent post paid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

THE INDEX OF THE TECHNICAL PRESS. Published monthly, by the Technical Press Association, 11 Queen Victoria street, London, E. C. England. Subscription price, 10s. 6d.

The Index of the Technical Press is exactly what its name states it to be, namely, a concise monthly index of the articles which have appeared in scientific periodicals during the preceding month. Each article appears in the Index in a short paragraph giving the author's name, the title of the article, a sentence or two of a salient description, the number of words in the periodical in which the article appears with reference to page and date of issue. Apparently the work is done with great care and thoroughness, as references are given to all of the English, German, French, Italian, Spanish, Russian, Scandinavian and Dutch papers. Each number contains reference to 2,500 or 3,000 articles and the practical engineer will find no superior method of easily finding reference to articles upon any subject which he may desire. Commencing with the April number the size of the page will be nearly doubled. In addition to about 2,000 résumés monthly the Index will contain a review of the engineering question of the month as well as extended notices or summaries of the most remarkable articles and papers of the month, appropriately illustrated—it will, in fine, be a review of reviews of the engineering Press.

TRADE NOTES

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of 336 to 342 Ellicott Square, Buffalo, N. Y., reports a large and increasing sale of its apparatus, especially of its bridging wall and desk telephones.

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., has just completed the installation of common battery multiple equipments at Gainesville, Tex.; Denton, Tex.; Springfield, O., and Elyria, O.

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, Ill., announces that the Citizens' Telephone Company, of Columbus, O., has increased the order placed with it some time ago. The original order called for complete Automatic equipment for 7,000 stations initial installation. The new order makes the number of stations to be installed in the beginning 8,000.

THE LINDSLEY BROTHERS COMPANY, 1308 Tribune Building, Chicago, Ill., reports a very heavy demand for poles of all sizes, but states that it is better than ever prepared to handle large orders as it has a large stock concentrated for shipment on rush orders. Besides having large stocks of poles at their different yards in Michigan they have equally well stocked yards in Idaho and are in position to fill heavy orders for Idaho Poles as fast as the railroads can supply cars.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Rochester, N. Y., and Chicago, Ill., has gotten out a little folder which is captioned "How Did the Conductor Telephone from the Car?" It tells of an instance on the Rochester & Eastern Trolley Road where the Stromberg-Carlson telephone system along that line was used in an emergency case to aid in the location of new trolley pole. The folder suggests that, "Those who want to know, should write to the Stromberg-Carlson Company."

THE CHICAGO WRITING MACHINE COMPANY, 90 Wendell street, Chicago, reports a phenomenal sale of Adjustaphones since the opening of the spring business. At the recent conventions at Milwaukee, Cincinnati and Des Moines, delegates expressed unqualified approval of the instrument, and showed their appreciation by leaving substantial orders. A number of old established exchanges which had simply put in a sample instrument to test, have decided to install Adjustaphones in place of the old style desk sets. In several instances managers announce that a nominal charge will be made for these instruments.

W. C. STERLING & SON, Monroe, Mich., report trade very good. Orders from telephone companies, especially those building farmers' lines, have come in early and the firm has filled 90 per cent. of its early orders already. It looks for an advance in price and has advised all its old customers to get their orders in early. Michigan has experienced an exceptionally hard winter. The snow fell before the swamps were frozen and made it hard to operate in the camps, and the snow was too deep to operate cheaply. The cedar dealers are not overstocked and many are short. The demand is increasing and prices are sure to advance.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—100 Drop Connecticut Switchboard, with 50 drops installed. In perfect condition, ready for operation. Used only few months. Price low. Inquire, HAMILTON TELEPHONE CO., Hamilton, N. Y. 156

FOR TRADE, for good real estate and part cash, a \$45,000.00 telephone property, earning 15 per cent. above running expenses. For particulars, address Box 148 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City, giving description and location of realties. 148

FOR Sale.—A \$27,000 telephone property earning 24 per cent. above running expenses. For particulars, address Box 147 THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 147

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$ AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich. 131

WANTED—Position as manager or assistant of telephone exchange of 200 or more subscribers. Over five years' experience in switchboard and construction work. Must be permanent. Address Box No. 86, Wellsburg, W. Va. 149

POSITION—Competent telephone man desires position. Seven years' experience in both inside and outside work. Thoroughly understands Common Battery and Magneto Systems. Best of references. Address Box 154, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 154

POSITION—As Manager or Superintendent of a plant of about 1,500 lines or over. Long period of experience, dating from the earlier magneto systems to the latest multiple Common-Battery installations. Thorough technical education. Gilt-edged references. Am holding good position. Desire change of climate. Address Box 155, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 155

POSITION WANTED—As manager of telephone exchange with three to five hundred subscribers. Married man. Thoroughly experienced. Have position with large company. For references and information, address Box 157, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 157

POSITION—Wanted as wire chief or switchboard man. Nine years' experience. Good references. Address Box 158, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 158

WANTED—Position by a man with eight years' experience on subway work, either as superintendent or general foreman. Excellent references. Address Box 159, care of THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 159

In buying Poles, price is an important factor, but there are other things that are at times even more important and able to overrule it.

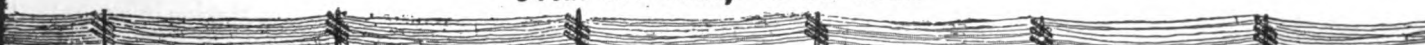
Maybe you can get a certain size four cents cheaper from some man who has a few hundred Poles on some side track in the woods. How long does it take to lose eight cents each, waiting six weeks for the car to arrive and possibly finding a couple dozen Poles not up to N. C. A. standard?

Moral: Buy where you are sure—MALTBY.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Empire Building.


"From the Stump to the Line"



PITTSBURG & LAKE SUPERIOR IRON CO **ESCANABA MICHIGAN**

PRODUCERS AND WHOLESALEERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

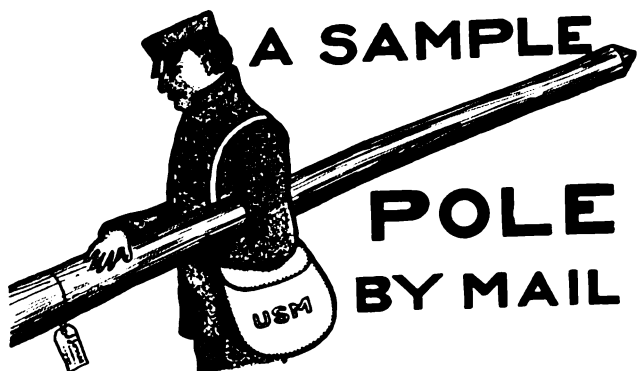
Suite 1206, Tribune Building,

CHICAGO, ILL.

Cross-Arms

The Standard Pole & Tie Co.

550 Venezuela Building, New York



A SAMPLE

POLE
BY MAIL

is hardly possible, we admit.
But why not try a

SAMPLE CARLOAD
of our

POLES
BY RAIL

Our Prices are attractive and we can make prompt
shipments.

SAND POINT CEDAR CO.
SAND POINT, IDAHO.

The **Valentine-Clark Co.**

*Des to announce to
users of . . .*

**CEDAR
POLES**

that they are now better equipped than ever before
for maintaining their prominent position among the
leaders in the cedar industry. Making a specialty
of Poles, they are identified with the leading pro-
ducing sections, concentrate their material at advan-
tageous shipping points and are in position for giv-
ing their customers the best of service.

Main Office . . .

*234 La Salle Street,
Chicago, Ill.*

Cedar Poles

Large Stock

Prompt Ship-
ment.

LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

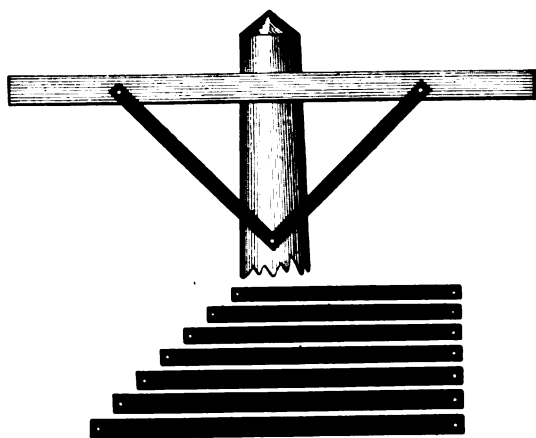
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN JAPPANED GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

IDAHO

THE LINDSLEY BROS. CO.

SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.

MENOMINEE, MICH.

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects. Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Out this out and mail it to us with the amount stated, and the order will be promptly shipped.

A B C of the Telephone.....\$1.00 By J. E. Homans.	The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
Diagrams of Electrical Connections......50	Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
Induction Coils.....\$1.00 By H. S. Norrie.	Practical Electric. This volume could rightly be called an Electric Encyclopedia......75
Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	Systematic Treatise on Electrical Measurements..... By H. C. Parker.
Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	Electrical Catechism.....\$2.00 By George D. Shepardson.
Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	American Telephone Practice.....\$3.00 By Kempster B. Miller.
The Electric Telephone.....\$6.00 By G. B. Prescott.	How to Make and Use the Telephone.....\$1.00 By George H. Cary.
The Inspector and Troubleshman.....\$1.00 By A. E. Dobbs.	The Telephone......50 By Prof. A. E. Dolbear.
Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	The Telephone, the Microphone and the Phonograph..... By Count Dumoncel.
Practical Features of Telephone Work......75 By A. E. Dobbs.	Practical Information for Telephonists..... By T. D. Lockwood.
The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	Elementary Treatise on Electric Batteries.....\$2.50 By A. Nianet. Translated by L. M. Fishback.
Small Accumulators......50 By Percival Marshall.	Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	Conduits for Telephone Work..... By Arthur Vaughan Abbott.
Induction Coils.....\$1.00 By G. E. Bonney.	Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	Patents and How to Make Money Out of Them.....\$1.25 By W. B. Hutchinson.
Electric Instrument Making for Amateurs......50 By S. R. Bottone.	Wireless Telegraphy.....In Press. By C. H. Sewall.
Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
The Telephone.....\$1.00 By William J. Hopkins.	A Practical Guide to the Testing of Insulated Wires and Cables.....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal

116 Nassau Street,
CITY OF NEW YORK

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Digitized by Google

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO.- MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.

BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you. Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. CHURCHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Salesman

costs you lots of money. He covers a limited territory only.

An Ad

doesn't cost much, and covers the whole territory. Write for prices.

We Make a Specialty of Telephone Poles.

POLES

Large Stock

16 to 25 ft.
4 to 6 in. Tops

For Rural Lines

POLES

YARDS:

Menominee, Mich.
Escanaba, " Minn.
Cloquet, Mont.
Heron, Idaho.
Cabinet, Ill.
Chicago, Ill.

FRANCIS BEIDLER & CO.
459-519 W 22d St.
CHICAGO, ILL.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and TOLL LINE ACCOUNTING. ♣ ♣ ♣

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



Do you always mention the

American Telephone Journal

when writing to advertisers? It will be appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly.
R. R. ARNAS, Manager.

LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR " "**
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

A Great Educator

It is conceded by all that
The American Telephone
Journal is the best paper
published about Tele-
phony. Write now for
sample copy and ask for
our combination offer on
any telephone book you
wish to buy.

**The American
Telephone Journal**

**116 Nassau Street,
New York City.**

Do you always mention the
American Telephone Journal
when writing to advertisers? It will be
appreciated by all concerned if you do.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
Rome, N. Y.
JAMES A. SPARGO, Pres. and Gen'l Mgr.

THE FAHNESTOCK TRANSMITTER COMPANY
Manufacturers of the "BUTTON" Type Telephone Transmitter
and complete Telephone Sets. Send for booklet. ☛ ☛ ☛
74 CORTLANDT STREET, NEW YORK CITY

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.
Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,
**ENGINEERS
CONTRACTORS**
Telephone Engineering and Construction
... Plans, Specifications and Estimates Promptly Furnished ...
Meritorious Independent Telephone Enterprises Financed.
1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltameters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOL-
TMETERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument
Co. Ritterstrasse, No. 88.
LONDON—Hilliot Bros. Century Works, Lewisham.
PARIS FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation
Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
Sole Manufacturers **THE OKONITE CO., Ltd. 253 Broadway, N.Y.**

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____

State _____
American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.
3-26

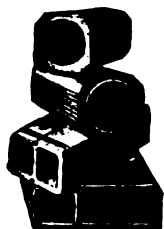
STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.
39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

VITRIFIED CLAY CONDUIT

1. 2. 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

An Ad

in a weekly paper reminds the purchaser fifty-
two times a year; in a monthly paper, but
twelve times.

16 to 1

is a dead issue, but

52 to 12

is not. It is our issue.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,
KANSAS CITY, MO.

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat
lighter and more convenient to handle than Steam Pipe, and at much
less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen
feet long. Treated by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and
Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

BITUMINIZED FIBER CONDUIT

Electrolysis-Proof

FOR UNDERGROUND CONSTRUCTION

Water-Proof

A SMOOTH LAMINATED INSULATOR OF UNCHANGING DURABILITY

Forming a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. The slightest abrasion of cables is an impossibility.

The highest expert electrical engineering talent is recognizing and testifying to the certain advance and advantage of our system of subway construction over all previous methods.

It saves sixty per centum of freight and handling charges and twenty per centum of construction cost.

This conduit is made on electrical lines.

All sizes 1 inch to 10 inches interior diameter, in seven-foot lengths. Bends of all angles.

For illustrated book and information apply to

AMERICAN CONDUIT CO.

336 Macy St., Los Angeles, Cal.

170 Broadway, New York, N. Y.

Manhattan Bldg., Chicago, Ill.

ADVERTISERS' DIRECTORY—Concluded

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie A. C. & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Conn. Tel. & Electric Co., Meriden, Conn.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Ericsson Telephone Co., N. Y.

Holtzer-Cabot Elec. Co., Brookline, Mass.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H. Co., Boston, Mass.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Holtzer-Cabot Elec. Co., Brookline, Mass.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Telephone Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

Bissell Co., The F., Toledo, O.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H. Co., Boston, Mass.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Holtzer-Cabot Elec. Co., Brookline, Mass.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Leslie, A. C. & Co. Montreal, Can.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

North Electric Co., Cleveland, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.

Cook, Frank B., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

McIntire Co., C., Newark, N. J.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Chicago Insulated Wire Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

National Wire Corporation, New Haven, Conn.

Okonite Co., New York.

Roebling's Sons Co., John A., Trenton, N. J.

Scovill Mfg. Co., Chicago, Ill.

Spargo, James A., Wire Co., Rome, N. Y.

Standard Underground Cable Co., Pittsburg, Pa.



**Experience
is a wise teacher**
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK



WE have paved the way for you to break away from the old and unreliable pulsating current party line systems which have given so much trouble on account of the delicate springs that are required on the bells, and which must be so carefully kept in adjustment.



Our Selective Telephones have no springs to adjust. No relays to get out of order. We place condensers in circuit to stop battery loss.

THE ONLY RELIABLE SYSTEM

Leich

Four

Party

4

Selective

Telephone

System

Write for descriptive matter on our Central Energy and Magneto Switchboards.

SEND FOR OUR SELECTIVE BULLETIN B6

AMERICAN
Electric Telephone Company
36-58 W. JACKSON BOULEVARD, CHICAGO, ILL.

THE AMERICAN TELEPHONE JOURNAL

Experimental and Spasmodic

advertising will not bring results. There is no reason why people should answer the first advertisement they see.

They may not be in the market at the moment, or are buying from some other house. You must convince them you have the goods to sell—the right kind at the right price.

Select the right medium and stick to it. The best medium gets letters like this :

We have found the American Telephone Journal an excellent advertising medium, and have traced many orders directly to its influence. It is the representative independent telephone organ.

SWEDISH-AMERICAN TELEPHONE CO.
Manufacturers of Telephone Apparatus, Chicago, Ill.

If you advertise persistently and well, nothing can be more certain than your success.

The time to begin is *now*. The time to stop is when you retire from business.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—APRIL 2, 1904—CHICAGO Number 14

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

THE STREET CORNER TELEPHONE.....By George A. Long, M. E.
TWO METHODS OF GIVING TOLL SERVICE IN CONNECTION WITH AUTOMATIC EXCHANGES..By Charles S. Winston
TELEPHONE EXCHANGE ENGINEERING—ARTICLE XVI...By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson
CIRCUITS AND OPERATION OF A COMMON BATTERY BRANCH EXCHANGE.....By Harvey Sproul
NEW LONDON TRUNK EXCHANGE. STRENUOUS POLE SETTING.

The Operating Field:

KEMPSTER B. MILLER AND SAMUEL G. McMEEN, CONSULTING ENGINEERS.
THE EVANSVILLE INDEPENDENT MEETING. CHINESE TELEPHONE SIGN
ANOTHER ANTI-HUM DEVICE. TWENTY TOLL LINES BETWEEN ST. JOSEPH AND KANSAS CITY
NEWARK-NEW YORK COMPANY INCORPORATED. TROUBLE FOR BELL AT NEW DECATUR, ALA.
MERCHANTS DISCARD BELL TELEPHONES AT JONESBORO, IND. WOLCOTT, N. Y., BESIEGED WITH RURALS
QUERIES. THE EDITOR'S PAGE. PATENTS.
THE WEEK'S MESSAGES. TRADE NOTES.
WANT AND FOR SALE ADVERTISEMENTS, PAGE 224.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves,
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DORIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

New Haven
Novelty Machine Co.,
ELM AND STATE STS.,
NEW HAVEN, CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK**

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

EXTRA POWERFUL

There is always something new under the sun.
Now it is our No. 36 X-P Type Telephone.

It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

We will tell you more about it if you ask.

ELECTRIC APPLIANCE COMPANY

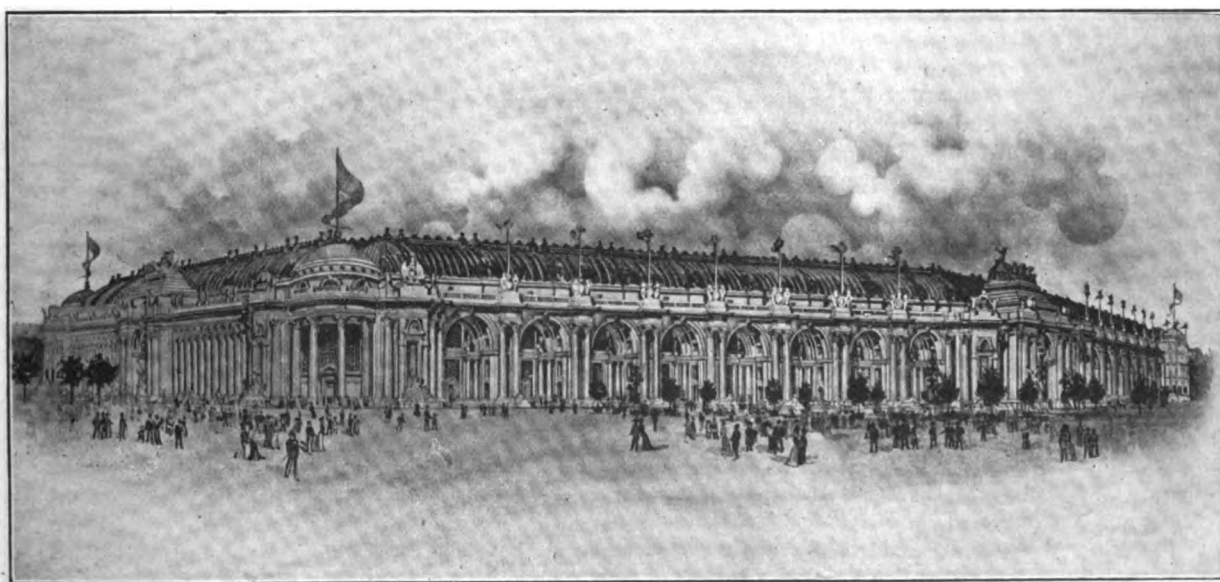
TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET - - - - CHICAGO

World's Fair Art Catalogue No. 18 NOW READY Mailed Free on Request

T
E
L
E
P
H
O
N
E

I
N
S
T
R
U
M
E
N
T
S



T
E
L
E
P
H
O
N
E

S
U
P
P
L
I
E
S

PALACE OF MANUFACTURES.

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus
Dealers in "Everything Used with Telephones" 909 Market Street, St. Louis, U.S.A.



THE OLD WAY and THE NEW WAY



The old way of transmitting messages was as reliable as the old way of connecting a few rural telephone lines by means of knife switches.



Our modern method for accomplishing this result is as much in advance of the old method as the new way of transmitting speech is over the old.

WRITE FOR DESCRIPTIVE BOOKLET 30-B

**STROMBERG-CARLSON
TELEPHONE MANUFACTURING CO.**

General and Eastern Sales Office:
ROCHESTER, N. Y.

Sales Department:
CHICAGO, ILL.





SPRING IS HERE



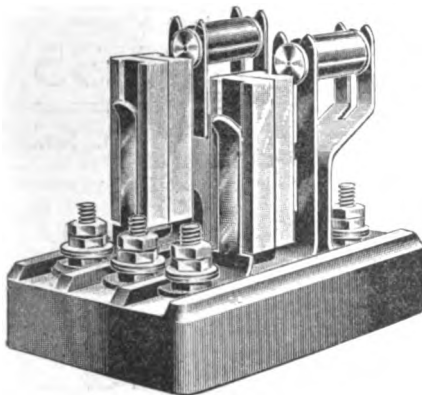
WITH ITS

STORMS

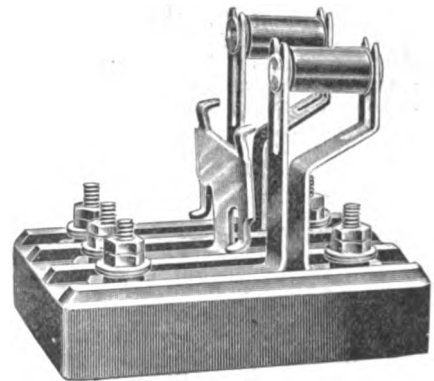
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 251 A.



Something New in a Protector for Telephones.
Order No. 251 B.

WRITE FOR PRICES.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



The
CENTURY
COMMON
BATTERY
SWITCHBOARD
ADAPTABLE TO
Magneto Systems

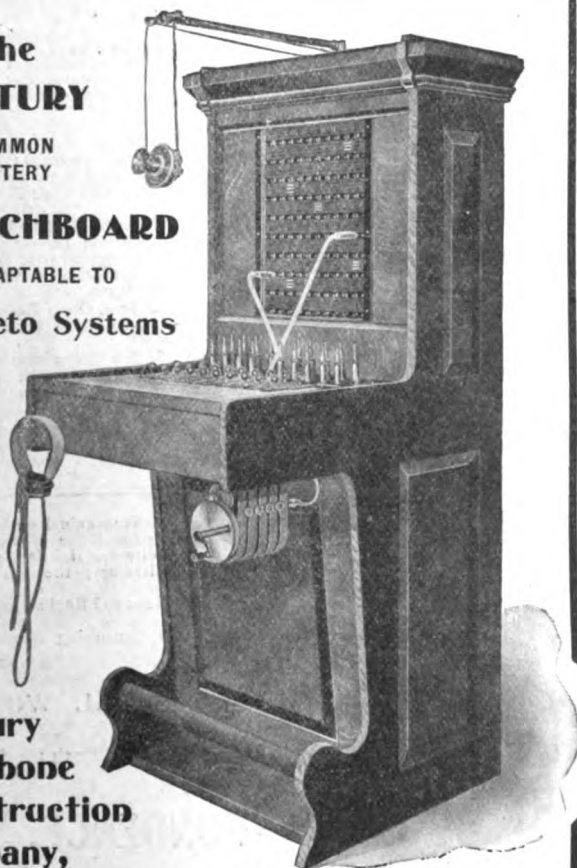
Simple
Durable
Efficient

WRITE
TODAY

Let Us
Tell You
About
It.

**Century
Telephone
Construction
Company,**

536 Ellicott Sq., BUFFALO, N. Y.



IT'S OUR BUSINESS
to convince you that in our new type
EXPRESS BOARD

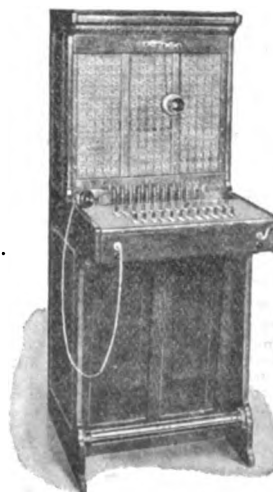
*We have reached
the acme of*

*Electrical and
Mechanical
Perfection*

*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



DRAWING ENGINEERING

Mechanical Electrical Stationary ARCHITECTURE **Civil Sanitary Textile**
TELEPHONY **COLLEGE PREPARATORY COURSE**
TAUGHT BY MAIL.

Illustrated Bulletin Giving Full Information of 60 Different Courses in Engineering Sent Free on Request.

HUNDREDS of aspiring young and middle-aged men in all walks of life know what the instruction of the American School of Correspondence is. Other hundreds need just such instruction to enable them to get on in life. To bring to the attention of draftsmen, engineers, architects, teachers and others interested in drawing, the standard of our instruction, we have compiled, from the regular instruction papers in our drawing courses, a practical treatise under the title of

Compendium of Drawing



Size of Page
7x10 in.
FULLY
INDEXED

**Two Volumes—
900 Pages
1,000 Illustrations**

including full page drawings, sections,
diagrams and folding plates.

BY EXPRESS (PREPAID)

\$3.00

PER VOLUME,
or both volumes for \$5.00.

Bound in Green Buckram.

Money Refunded if not Satisfactory.

On receipt of this amount (Address Room 9L) and the names of two persons who would be benefited by our courses, the books will be sent express prepaid with the privilege of returning within ten days if not satisfactory and money refunded. The regular examination questions of the School are bound into each volume to test the readers' knowledge. The separate volumes necessary to cover the ground would easily cost \$15.00. We are offering it substantially at cost because we know an examination of the work will show at once the practical value of our instruction.

PARTIAL TABLE OF CONTENTS.

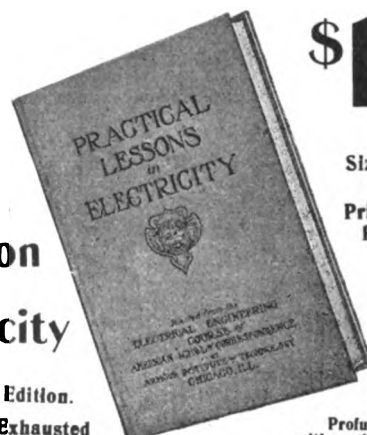
PART 1.

MECHANICAL DRAWING, by Prof. E. Kenlson, Mass. Inst. of Tech., Boston.
SHADES AND SHADOWS, by Prof. H. W. Gardner, Mass. Inst. of Tech.
PEN AND INK RENDERING, by D. A. Gregg, Mass. Inst. of Tech.
PERSPECTIVE DRAWING, by Prof. W. H. Lawrence, Mass. Inst. of Tech.
ARCHITECTURAL LETTERING, by F. C. Brown, Architect, Boston.

PART 2.

WORKING DRAWINGS, by Prof. W. H. James, Mass. Inst. of Tech., and Prof. C. L. Griffin.
MECHANISM, by Prof. W. H. James, Mass. Inst. of Tech.
MACHINE DESIGN, by Prof. C. L. Griffin, formerly Prof. of Machine Design, Pa. State College.
SHEET METAL PATTERN DRAFTING AND TINSMITHING, by Wm. Neubecker, N. Y. Trade School.

A 300 Page Book on Electricity



\$1.35
By Express
(prepaid)

Size of Page
7 x 10 in.
Printed on
Plate Paper.

Bound
in
buckram.

New Enlarged Edition.

**First Edition Exhausted
in Two Weeks.**

Profusely Illustrated
with sections, diagrams,
tables and full-page plates.

To demonstrate the standard, scope and methods of the American School of Correspondence in teaching Electrical Engineering, by mail, we have bound up four representative instruction papers in our Electrical Engineering Course under the title of

Practical Lessons in Electricity

and will send one copy, express prepaid, to every reader of **AMERICAN TELEPHONE JOURNAL** who sends us \$1.35 and the names of two persons whom he knows to be interested in the subjects we teach, designating the subject. (Address Room 9L.)

The book is invaluable to *telephone men*, as the chapter on wiring covers fully the requirements of the National Board of Underwriters. *Patent attorneys, owners of electric launches and automobiles* find it a useful manual for ready reference.

THE AMERICAN TELEPHONE JOURNAL says:

"The section on Storage Batteries, by Prof. Crocker, of Columbia University, strikes us as being particularly good. It gives just the sort of storage battery information and tells it in just the sort of way that will reach the practical telephone man, who should at least have a good idea of this appliance which is now so common in these days of central energy."

Partial List of Subjects Embraced:

STORAGE BATTERIES (by Prof. F. B. Crocker, Columbia University): Types; General Principles; Chemical Action; Data Sheets; Edison Storage Battery; Charging; Efficiency; Troubles and Remedies; Testing; **Portable Batteries for Automobiles and Boats**; etc.
ELECTRIC WIRING (by H. C. Cushing, Jr., author of *Standard Wiring*): Dynamo Installation; The Switch Board; Motor Installation; Tables; Transformers; Three-Wire System; Poles and Pole Setting; Inside Wiring; Arc Light Wiring; Conduit Work; Fixture Wiring; Cut-outs; Switches; Arc and Incandescent Systems; Fuses; Inspection; etc.
ELECTRIC CURRENT (by L. K. Sager, S. B.): Volt, Ampere, Ohm; Resistance; Conductivity; Tables; Circuits; Grouping of Cells; Quantity; Energy; Power; Coulomb; Joule; Watt; etc.
ELEMENTS OF ELECTRICITY (by L. K. Sager, S. B.): Experiments with Magnets; Conductors and Insulation; Leyden Jar, Voltaic Cell; Electromagnets; Induction Coil; Electrotyping and Electroplating; The Telephone; The Telegraph; Sounder, Alphabet; etc.

The book is easily worth \$3.00, and we offer it at the above low price for a limited time, believing that it will be the means of interesting the purchaser further in the work of the American School of Correspondence.



THE TECHNICAL WORLD is a monthly illustrated technical journal devoted to the interests of the technical worker and the practical business man who wants information on the hundred and one problems in engineering which are constantly arising in daily life requiring a knowledge of electricity for lighting, power, electric bell; steam;—the scientific heating, ventilation, and plumbing of buildings;—architecture;—the uses of the telephone and telegraph, etc.

A very valuable department is the **MONTHLY REVIEW** of the leading articles in the American and English journals. These reviews are written by specialists and take up the latest and best in science and invention.

Subscribers are offered the advantages of professional advice from the staff through the Consulting Department of the Magazine.

SUBSCRIPTION PRICE, \$2.00—20 CENTS A COPY.

**SPECIAL
CLUBBING
OFFER**

\$2.00

One Year's Subscription to **THE TECHNICAL WORLD**
AND

PRACTICAL LESSONS IN ELECTRICITY—Both for \$2.00

This Offer Expires June 1st, 1904.

AMERICAN SCHOOL OF CORRESPONDENCE,

AT
ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO, ILL.

Mention the AMERICAN TELEPHONE JOURNAL

Not Toys!
Not Experiments!!
Not Attempts!!!

BUT

**THE
PERFECT
INSTRUMENT**

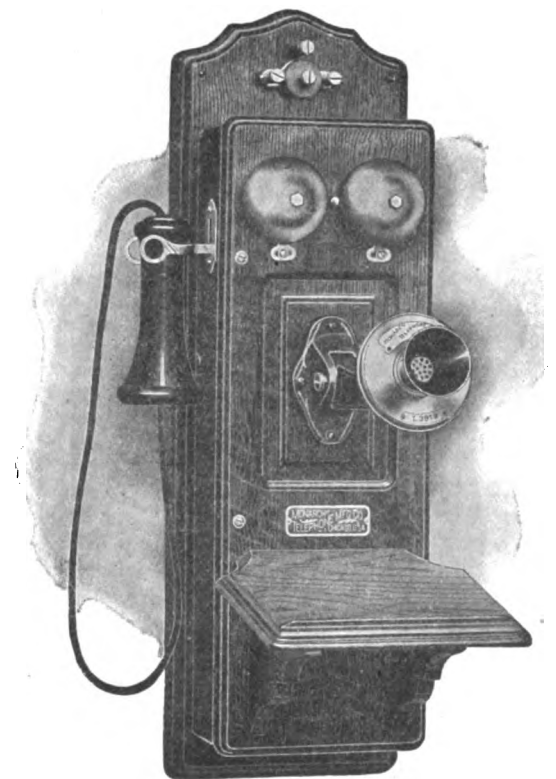
**KELLOGG
TELEPHONE
APPARATUS**

Serenely Leads
the World!

Kellogg Switchboard and Supply Company
Green and Congress Streets, CHICAGO

Electric Building, CLEVELAND

Keystone Telephone Building, PHILADELPHIA



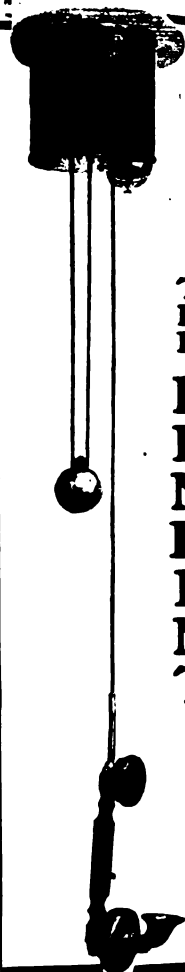
MONARCH COMPACT TYPE TELEPHONES

embody features of construction which give them many practical advantages. All parts are readily removable without disturbing the permanent wiring and the workmanship throughout is of the best. We fully guarantee them.

MONARCH TELEPHONE MFG. CO.

14 So. Clinton Street

CHICAGO, ILL.



You Must Sit Down

to use the ordinary desk telephone with any degree of ease; **YOU MUST GET UP TO USE THE WALL TYPE.** :: :: ::

But it is different with

**THE
PENDENT
TELEPHONE**



Suspended within reach and movable and adjustable anywhere in the office or apartment

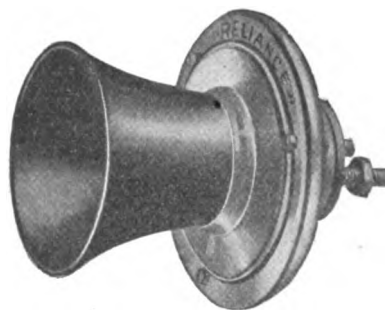
A Comfort, Necessity and Ornament at the Price of a Standard 'Phone

THE VOUGHT-BERGER COMPANY

Makers of First-Award
Telephones, Switchboards and Appliances
LA CROSSE WISCONSIN

Reliance Transmitter

No. 90



For mounting on woodwork
or adjustable arms



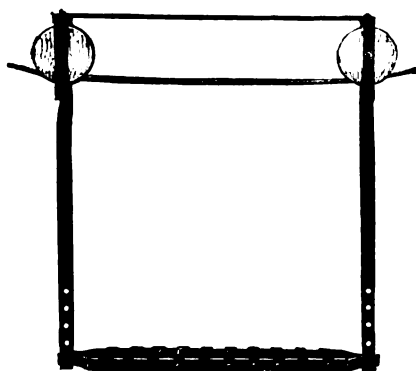
The Button
(actual size)

**ORDER ONE TO-DAY
SAMPLE PREPAID**

75 Cents.

S. H. COUCH CO.

162 PEARL ST. BOSTON, MASS.

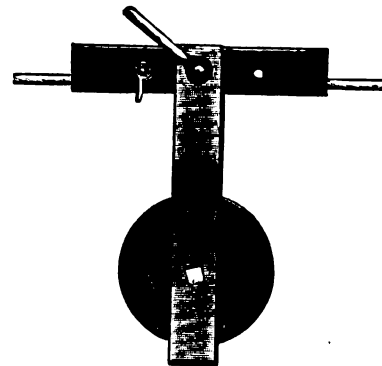
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co. 37	Dickey Clay Mfg. Co., W. S. 36	Klein, Mathias, & Sons. 34	Roebbling's, John A., Sons Co. 32
American Electric Teleph. Co. 40	Eastern Telephone Mfg. Co. 9	Leslie, A. C., & Co. —	Sand Point Cedar Co. 30
Am. School of Correspondence. 6	Electric Appliance Co. 3	Lewis Lumber & Mfg. Co. 33	Scovill Mfg. Co. 2
American Vitrified Conduit Co. 39	Elkin Machine Co. 33	Lindsley Brothers Co. 32	Spargo, James A. Wire Co. 34
Automatic Electric Co. 11	Ericsson Telephone Co. 10	McIntire, C., Co. 36	Standard Pole & Tie Co. 29
Barr, W. J., Mfg. Co. 12	Fahnestock Transmitter Co. —	Maltby Lumber Co. 29	Standard Underground Cable Co. —
Beidler, Francis & Co. 33	Fowler, John H. 30	Michigan Cedar Co. 33	Standard Vitrified Conduit Co. 36
Bissell Co., The F. 11	Franklin Rolling Mill & Fdy. Co. 31	Middleton, J. W., & Co. 34	Stanton, L. W. 34
Burnley Battery Co. 33	Garton-Daniels Co. 11	Miller Anchor Co. 11	Sterling, W. C., & Son. 33
Butterfield, J. F. 34	Gest, G. M. 38	Monarch Telephone Mfg. Co. 8	Sterling Electric Co. 5
Camp, The H. B. Co. 39	Hemingray Glass Co. —	Nagel, W. G., Electric Co. 9	Stromberg-Carlson Telephone Mfg. Co. 4-10
Central Mfg. Co. —	Holtzer-Cabot Electric Co. —	National Wire Corporation. 35	Swedish-American Tel. Co. 12
Central Telephone & Electric Co. 3	Imperial Finance & Cons. Co. 34	New Haven Novelty Machine Co. 2	Telephone Printing Co. 33
Century Telephone Const. Co. 34	Ingram-Richardson Mfg. Co. 12	Nungesser Electric Battery Co. —	Valentine Clark Co. 30
Chicago Insulated Wire Co. 5	Index of the Technical Press. 30	Okonite Company 34	Vought-Berger Co. 8
Chicago Writing Machine Co. —	Inland Steel Co. 32	Pacific Coast Pole Co. 30	Wanted Situations, etc. 224
Churchill, E. 33	International Telephone Mfg. Co. 5	Pignolet, L. M. 32	Weston Electrical Instrument Co. 34
Cohn & Bock. 33	Kellogg Switchboard & Supply Co. 7	Pittsburg Lake Superior Iron Co. 29	Wisconsin Timber & Land Co. 33
Columbia Mfg. Co. 33	Bissell Co., The F., Toledo, O. —	Pittsburg Sewer Pipe & Conduit Co. 36	Worcester, C. H., Co. 29
Columbia Mfg. Co. 33	Chicago Insulated Wire Co., Chicago, Ill. —	CABLE SLEEVES.	Yesbera Mfg. Co. 12
Connecticut Teleph. & Electric Co. —	Kellogg Switchboard & Supply Co., Chicago, Ill. —	Nagel, W. G., Electric Co., Toledo, O. —	
Cook, Frank B. 35	Nagel, W. G., Electric Co., Toledo, O. —	New Haven Novelty Machine Co., New Haven, Conn. —	
Couch, S. H., Co. 8	National Wire Corporation, New Haven, Conn. —	CIRCUIT CLOSERS.	
Crumb, W. H., Co. 34	Okonite Co., New York. —	Garton-Daniels Co., Keokuk, Ia. —	
Cunningham Iron Co. 36	Roebbling's Sons Co., John A., Trenton, N. J. —	CARD INDEX SYSTEMS.	
	Standard Underground Cable Co., Pittsburg, Pa. —	Shaw-Walker Co., Muskegon, Mich. —	
	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. —	CLIMBERS.	
	CABLE HANGERS.	Klein & Sons, Mathias, Chicago, Ill. —	
	Bissell Co., The F., Toledo, O. —	Nagel, W. G., Electric Co., Toledo, O. —	
	Cook, Frank B., Chicago, Ill. —	CONDUITS.	
	Nagel, W. G., Electric Co., Toledo, O. —	American Conduit Co., Chicago, Ill. —	
	Standard Underground Cable Co., Pittsburg, Pa. —	American Vitrified Conduit Co., New York. —	
		Camp Co., The H. B., New York. —	
		CONSTRUCTORS.	
		Cook, Frank B., Chicago, Ill. —	
		McIntire Co., C., Newark, N. J. —	
		Nagel, W. G., Electric Co., Toledo, O. —	
		CONSTRUCTION SUPPLIES.	
		American Electric Tel. Co., Chicago, Ill. —	
		Electric Appliance Co., Chicago, Ill. —	

WANT AND FOR SALE ADVERTISEMENTS, PAGE 224.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

Telephones "Eastern" Switchboards
LOCAL or COMMON BATTERY MAGNETO or COMMON BATTERY

Eastern Telephone Manufacturing Company

WRITE US

WEST CHESTER

PENNSYLVANIA

A High Quality-Efficient-Durable and Cheaply Maintained Telephone.

Is what **you know**
you're getting when
you buy an Ericsson.

The first cost is
practically the only
cost. No repairs or
after expenses are to
be counted as with
cheaper grades.

Write to-day for il-
lustrated booklet and
price list.

**Ericsson
Telephone
Co.,** "Strictly
Independent."

Manufacturers and Importers of

**Switchboards, Telephones and Telephone
Supplies for Magneto and Common Battery.**

296 Broadway, N. Y.



ADVERTISERS' DIRECTORY—Continued

Hemingray Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Leslie, A. C., & Co., Montreal,
Can.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago,
Ill.

CORRESPONDENCE SCHOOL.

American School of Correspon-
dence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Townsend Cedar & Supply Co.,
Chicago, Ill.

ENGINEERS and CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Stanton, L. W., Cleveland, O.

FILES.

Shaw-Walker Co., Muskegon,
Mich.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., To-
ledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.

CONTINUED ON PAGE 11.

The 1900 Dry Battery

THE most needed quality is reliability. No one wants a battery that will respond all right for a week or ten days then "suddenly go out of business." Another requirement is that it shall continue "strong" during its life. These two requirements besides many others are characteristics of

1900 BATTERIES

We guarantee them not to freeze, leak or break; we warrant them to work with a strong steady current during their life (anywhere from six to eighteen months).

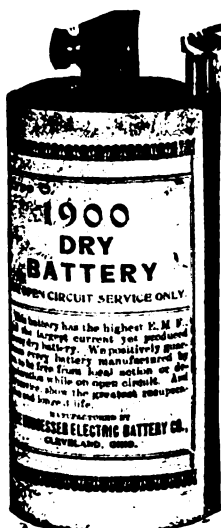
They are compact, always ready. They are better than wet batteries—no slop, no repairs, no breakage. Any one can replace a worn out one at a moment's notice. They can be carried anywhere—always ready for instant use.

Write us for our Complete List of Batteries and Telephone Supplies

STROMBERG-CARLSON TELEPHONE MFG. CO.

General and Eastern Sales Office
ROCHESTER, N. Y.

Sales Dept.
CHICAGO, ILL.



Automatic Telephone Service

IN

Lincoln, Neb.

THE new 3,000-station Automatic Exchange installed by the Automatic Electric Company for the Lincoln Telephone Co., began service on March 15th. The entire equipment was installed within six weeks after the exchange building was finished.

Thus, another large Western city throws off the yoke of telephone monopoly.

Are you interested? Write us.

**AUTOMATIC
ELECTRIC
COMPANY**

**CHICAGO
U. S. A.**

ADVERTISERS' DIRECTORY—Continued

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Fittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Standard Pole & Tie Co., New York.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

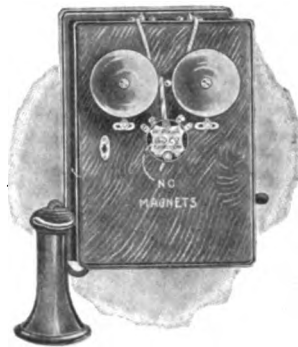
CONCLUDED ON PAGE 37.

No Magnets

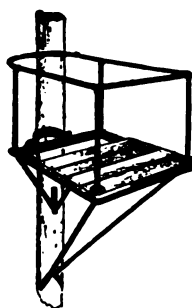
You can't burn it out if you try

The G. D. DROP

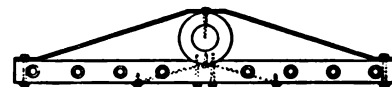
Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple. Durable. Cheap. Pamphlet D6.



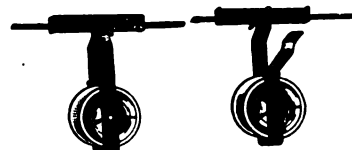
GARTON-DANIELS CO., Keokuk, Iowa



POLE PLATFORM
With Railing - \$7.25
Without Railing, \$4.25

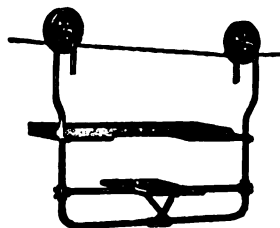


DOUBLE ARMING BRACES



CABLE TROLLEYS, \$1.80 each.

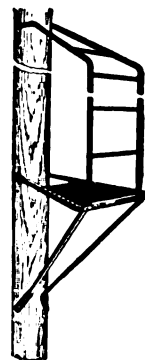
Send for Bulletin 233.



CABLE CARS
Without Table, \$7.50
Add for Table, \$2.50



PANELS



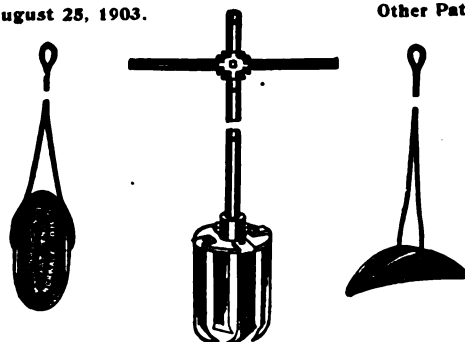
POLE SEATS, \$3.00
Pole Ladders, \$4.00

THE F. BISSELL COMPANY
TOLEDO, O.

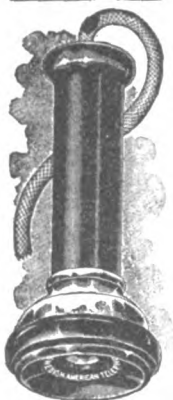
"THEY NEVER PULL UP"

Patented August 25, 1903.

Other Patents Pending



Write for Description and Prices.
THE MILLER ANCHOR CO., Norwalk, Ohio



No. 19 Receiver

YOU MAY THINK

you know all about telephones, and yet have never investigated the merits of our product. Take a hint from us and investigate. Our apparatus is the result of industry and sound practice, and represents true mechanical value in every detail.



No. 19 Receiver

AN OPPORTUNITY

is all we ask. We can convince you of the superiority of our equipment. Get our prices and specifications before placing your orders.

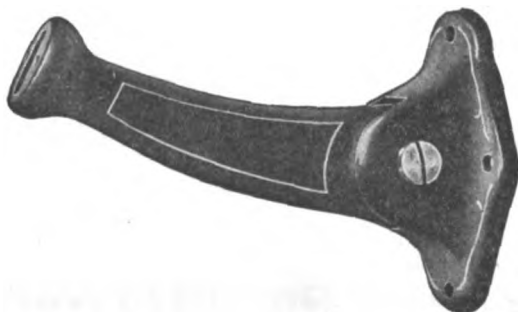


**SWEDISH-AMERICAN
TELEPHONE COMPANY**
CHICAGO ILL.



WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



Signs of the Times
and for all time.

That's our

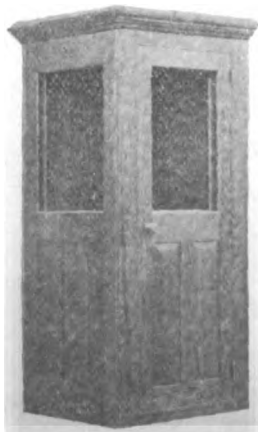
*Enameled Iron
Telephone Signs*

Substantial—Lasting—Attractive

All successful companies use them. Write us
now for prices.

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

Booths Pay Dividends



They pay for themselves over and over again, that is if they are the right kind—the kind we make. Our **Booths** last a life-time; are absolutely sound-proof and cost less than any other make. Every public telephone should have its **Booth**.

Write for catalogue.

YESBERA MFG. CO.
TOLEDO :: :: :: OHIO



The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, APRIL 2, 1904

NUMBER 14

STREET CORNER TELEPHONES

By GEORGE A. LONG, M. E.

OF the various dividend producing branches of telephony there is none more profitable to the operating company and more satisfactory to the general public than the

automatic pay station.

While but a few years ago such service was unheard of, to-day it comprises part of the equipment of practically all progressive companies. The larger companies have their superintendent of pay stations and he has his force of assistants.

In almost any hotel, drug store or café can be found the public station and the operating company does not consider its territory properly covered unless all such places are provided with instruments of this

sort. The Bell companies have obtained excellent financial results with these instruments and collections amounting to as high as \$250.00 per month have been made from a single station located in a depot. Still the public are not properly supplied with the telephone until they can have it as handy as the mail box. Think of a person being obliged to go to a hotel or depot to post his letters. Uncle Sam has made provision in these places as well as on the street for doing so. Deprive the citizen of the letter box on the corner and you will get a proper idea as to the convenience of street telephone pay stations. As the mail and telephone are both for the collecting of mes-

sages, why should not the comparison be a good one? In all cities and towns where there is telephone service, a person familiar with conditions can select numerous locations where the street pay station should come in for a large amount

of business. The installation of such sets has always proved a money-maker to the companies that have added them to their equipments. In some places the operating company has arranged

with the city officials, in consideration for the privilege of placing street stations, to give the public free use of them for calling the police, fire department or hospitals, it being understood at the telephone exchange that all emergency calls from these stations can be made without charge.

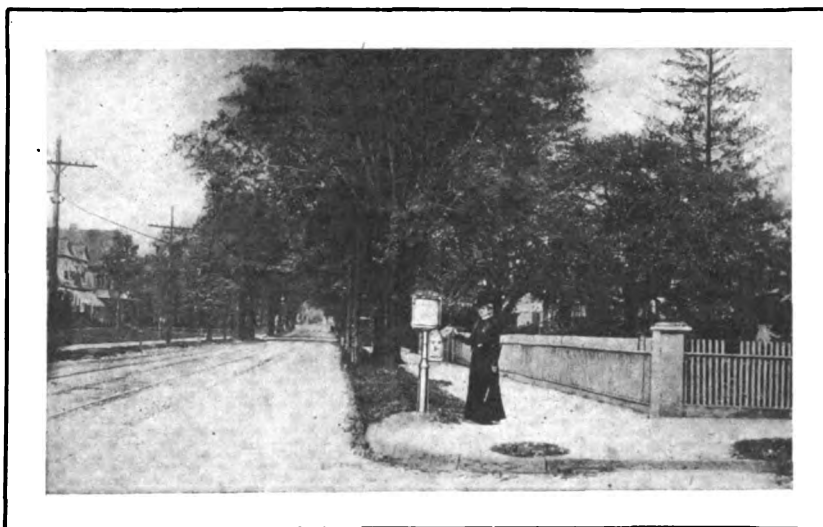
There is no reason why these stations should not supersede the so-called police telephone systems now in use. By the operating company making the proper proposition the police could be induced to

send in their reports to headquarters over these public stations. If such arrangements should come about there would be no more boxes on the streets than at present and the blue police

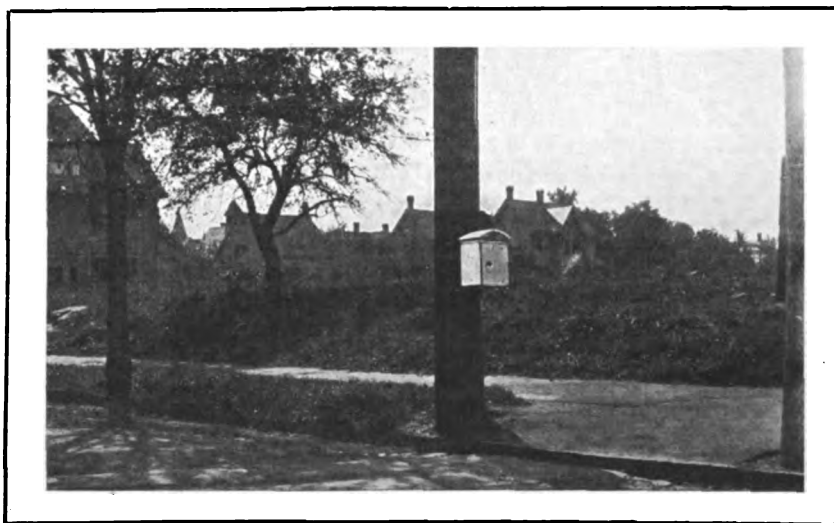
box now so common would be a thing of the past. Think of the advantage of these street stations in case of fire, especially at night. Now a person wishing to send in an alarm has to awaken his neighbor and get the key and during all this time the fire is making headway, while with the street telephone all one has to do is to call fire headquarters direct, and inform it of the location of the fire. These street stations should be convenient in the residential section of any city where there

are no stores and in the public parks where a person out driving can get in touch with the center of the city at any time.

At Bridgeport, Conn., this type of station was in use over three years ago and was the first station installation in the United



Street Corner Telephone at Bridgeport, Conn. This One is Placed on the Same Iron Post with the United States Mail Box. The Line Wires Come Up Inside the Hollow Column.



Street Telephone Installed on One of the Company's Poles. The Door Can be Opened by Turning the Knob, and Inside Are Found a Directory and the Pay Station.

States, if not in the world, of this type, and the receipts were satisfactory from the start. These stations are keyless and by turning the handle the door can be opened. Inside is to be found the pay station, also a directory. The user calls central and if the desired connection can be had the operator requests the deposit of a coin of the proper denomination for said call. No

special wiring has to be installed and these stations can be placed on the iron post which is hollow to allow for underground wires or they can be placed on the regular telephone pole. The maintenance on these stations is said to be very light. They can be finished in aluminum, which will stand the weather well, and will always be neat and attractive in appearance.

TWO METHODS OF GIVING TOLL SERVICE IN CONNECTION WITH AUTOMATIC EXCHANGES*

BY CHARLES S. WINSTON.

IT is the purpose of this paper to describe the operation of the circuits installed during the last year in toll boards for use in connection with automatic exchanges. The automatic exchange at Grand Rapids is adapted to numbers requiring four

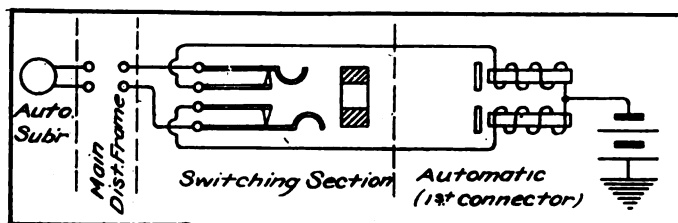


Figure 1.

movements of the subscriber's dial, giving a capacity for something less than 10,000 lines. The switchboard is essentially a trunking system. At Grand Rapids each subscriber's line terminates at the central office in a switching device termed a first selector, the function of which is, in response to the first movement of the subscriber's dial, to continue his line through a trunk line leading to a second switch termed a second selector. This is in a group corresponding to the particular thousand in which

finished, and marked consecutively from 0 to 9, one marked "toll." Whenever a subscriber desires a toll connection he will place his finger in this extra hole and turn the dial. By so doing he will operate the first selector. The operation of this selector will establish a connection between the subscriber's instrument and the first of a number of recording trunk lines which is not in use. Each recording trunk line ends in a lamp and jack at a position of the toll board termed the "recording operator's position." When, then, the automatic subscriber turns his dial, as stated above, a circuit is established from his telephone to the recording operator's position. If the subscriber were calling a second automatic subscriber he would, after making the proper movement of his dial, press the ringing button, thus grounding one side of the line and operating a relay, which would cause current from generator to pass out over the line of the so-called subscriber and ring the bell of that subscriber. In the case of a call for toll the subscriber will press the ringing button in the same manner, but the result of his act will not be the same. Instead of closing a circuit for generator current, a relay at the recording operator's position will be operated and a lamp lighted, thus attracting the attention of the recording operator.

In front of this operator are located a certain number of plugs

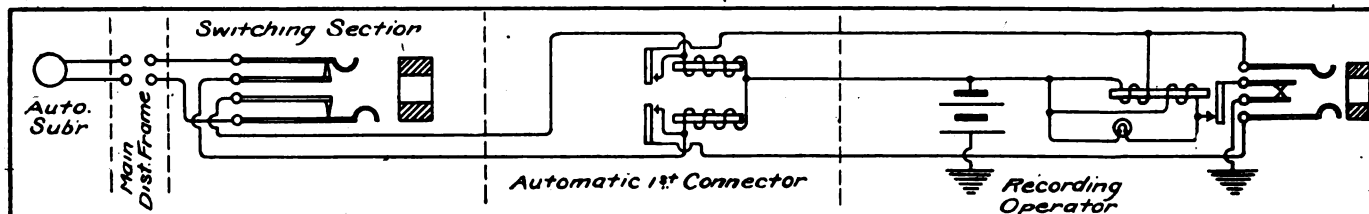


Figure 2.

the called subscriber's number exists. The second movement of subscriber's dial operates the second selector and continues the line connection through a trunk leading to a third switching device called a connector. The connection is thus continued to the group of hundreds corresponding to the second digit in the called subscriber's number. The third movement of the dial operates this connector to pick out the group of tens in which the called for subscriber belongs, and the fourth movement causes the connector to select the proper unit, thus completing the connection with the called subscriber's line.

adapted for use with the recording trunk lines. In response to the lighting of trunk lamp the recording operator will insert one of these plugs into the trunk jack, and after throwing a listening key obtain from the subscriber the order. She will then write the information on a ticket, pass it to a toll line operator and tell the subscriber to hang up his receiver until called. Replacing the receiver restores his line to normal condition.

(Each toll operator's position is provided with cords, one plug of each being adapted to use with a multiple or answering jack of a toll line and the other in connection with a multiple jack of a

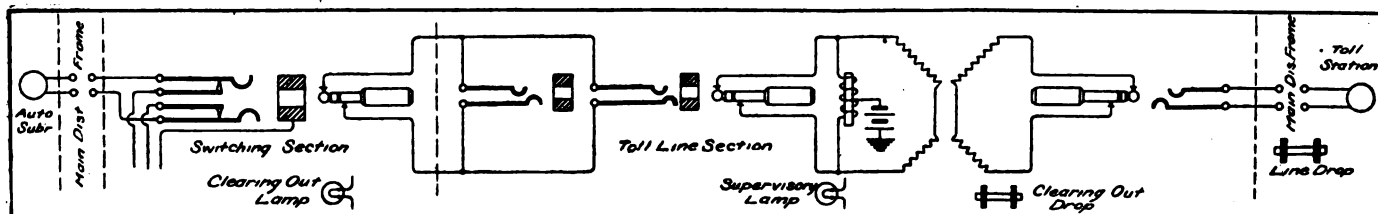


Figure 3. Complete Connection Between a Toll Station and an Automatic Subscriber.

Each line at Grand Rapids upon entering the exchange passes (see Fig. 1) through the main distributing frame and then through a cut-off jack located in a so-called switching section in the toll room to the first connector.

The dial on the telephone set of each subscriber in the automatic exchange has in addition to the ten holes ordinarily fur-

trunk line leading to the switching section. This trunk terminates in a plug which may be connected with any local line by inserting it into the cut-off jack of the line. To state this in another way, each toll line is multipled through the toll sections as in ordinary manual practice, and one side of each toll operator's cord circuit is adapted to use in connection with these jacks. These toll trunk lines terminate in plugs on the toll switching section, and connection may be made between any automatic subscriber's line and

* Paper read at a meeting of Telephone Engineers in Chicago.

any trunk line by inserting the plug of the latter into the jack of the former.)

As soon as the toll operator receives the ticket from the recording operator she will insert one of the plugs adapted to toll service into a jack of the desired toll line and call the person wanted. When the toll operator succeeds in finding the party she will over an order wire to the operator at the switching section, give the number of the automatic subscriber who called toll, and receive in return the number of the trunk line which is to be used. The toll line operator will then insert the plug, corresponding to the toll plug already in the toll line jack, into a multiple jack of the designated trunk, and the switching operator will, after testing the cut-off jack of the automatic line and finding it free, insert the toll trunk plug into it. The toll line operator will immediately assume charge of the connection and ring the automatic subscriber. When he answers she will tell him to make a movement of his dial, after which she will allow the conversation to begin. The reason for making this request requires explanation. At the end of conversation between two automatic subscribers the apparatus at the exchange is restored to its normal position when the calling subscriber hangs up his receiver, placing a temporary ground upon both sides of the line simultaneously. As the called subscriber makes no movement of his dial before conversation his instrument is not in a position to ground the line when he replaces the receiver. In the case of a toll connection the automatic subscriber is called from the toll board, and as his instrument must perform the clearing out function, it is necessary to first place it in condition to do this by a preliminary movement of the dial. Connected in series across the automatic end of each cord circuit are the windings of a double relay, the inside terminals of which are connected to the ungrounded side of battery. Whenever ground is applied to either or both sides of a line to which a cord circuit is connected this relay will be energized and a lamp displayed. This lamp serves as a disconnect signal and enables the subscriber to signal the operator by pressing the ringing key, thus placing a ground on one side of the line, or if his dial has been moved, he may hang up his receiver.

There are two disconnect signals—the falling of a clearing drop in the toll side of the cord and the lighting of a lamp in the automatic side. The act on the part of the toll operator of removing the automatic plug from the toll trunk jack will light a lamp associated with the toll trunk plug at the switching section, and the operator will remove the connection.

Except that the toll line operator makes out the ticket the step which it is necessary to take in establishing and removing the connection, when a person at a toll station calls for an automatic subscriber, is the same as described above, after the toll line operator receives the ticket from the recording operator. In establishing such a connection the recording operator plays no part.

During a conversation between a toll and an automatic subscriber the connection normally existing between the automatic subscriber's station and the automatic exchange is broken at the switching station, and therefore the multitude of contacts in the talking circuit and the bridges present across the talking circuit are removed. There is, therefore, no reason why excellent toll service should not be furnished.

While the Dayton toll board is similar to the one at Grand Rapids, there are some radical differences. At Dayton the dials are not provided with special holes for calling toll, but a certain number is used. With this exception subscribers notice no difference in the steps to obtain a toll connection. At Dayton there is no switching section and, although an automatic subscriber desiring a toll connection is first placed in communication with a recording operator, who, after obtaining the necessary information for making out a ticket, requests him to hang up his receiver, yet conversation takes place through the automatic exchange apparatus, the toll operator calling the automatic subscriber by means of a dial similar to the ones furnished the subscriber. One dial is furnished for each operator's position, and a key in each cord circuit enables the dial to be used in connection with any one.

The disconnect signal is received at the toll board in the same manner as at Grand Rapids. If, however, the automatic subscriber did not move his dial when requested to do so by the operator, arrangement is made by means of which a ground is momentarily placed upon the trunk line.



THE LAST OF THE AERIAL.

FOR a little more than a decade New York has waged a relentless warfare against the unsightly pole lines that have previously encumbered its streets. To-day witnesses the disappearance of the famous West street pole line, which, in times gone by, was probably the most famous open wire line in the country, unsurpassed in importance or in magnitude by any. In its halcyon days, the line extended from the Battery northward to Twenty-third street. It was constructed of the most magnificent poles ever used. For this purpose the most carefully selected Norway pine ship's masts were obtained, upon which were supported the hundreds of wires that the line carried. But with the progress of underground construction, and the demand for unencumbered streets, the old West street line has dwindled day by day. In a recent issue we showed that it had been restricted to but a few cross arms. Now even the circuits which these supported have been buried, the loaded cable making this possible. The long distance wires carried by this line, the last to yield to the encroachments of the conduit, have disappeared, and the old line is now but a memory. The illustration shows the construction crews chopping down the last of the poles on a Sunday morning. All of the wire and cross arms had previously been removed.

TELEPHONE EXCHANGE ENGINEERING

ARTICLE XVI.—MULTIPLE CABLE.*

BY RAY H. MANSON, ALBION D. T. LIBBY AND CHARLES A. SIMPSON.

ABOUT half of the cable in the modern multiple switchboard is for the multiple wiring. So it becomes desirable to consider the details of manufacture and installation to reduce cost to a minimum. Machine-made cable is used exclusively

from 21 pair to 100 pair, and is made in either round or oval

* NOTE.—This article is a continuation of "SWITCHBOARD CABLE AND CABLING," commenced in the Nov. 28th and Dec. 5th issues of the AMERICAN TELEPHONE JOURNAL.

for multiple wiring and varies, with the make of switchboard, cross section. In all cases the wires are looped to the terminals of the multiple jacks, which are mounted in banks of from 20 to 100 each, the 20 per strip mounting being standard.

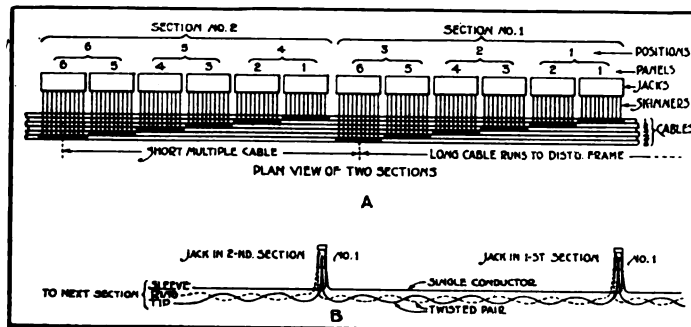


Figure 51. Layout of Jack Wiring.

Fig. 51-A represents a layer of multiple jacks with attached cable wired through two three-position switchboard sections. Here six cables constitute a layer corresponding to the six panels of jacks in a section. The wires in cable No. 1 are looped to the strip of jacks of the first panel of each section; those from cable No. 2 to the strip of jacks of the second panel of each section, etc. Fig. 51-B shows the actual wiring of one line circuit through cable No. 1. The wires of this circuit are looped in and soldered to the

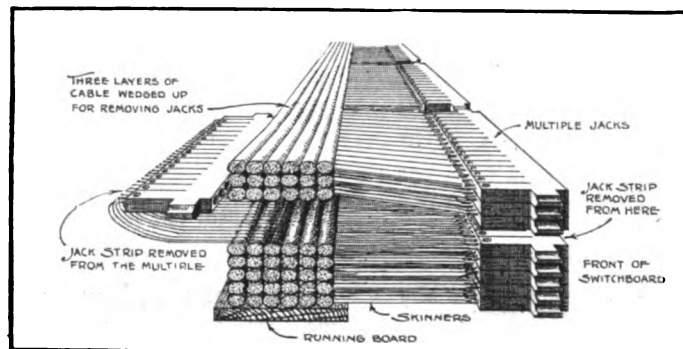


Figure 52. Strip of Jacks Removed from Section.

tip, ring and sleeve of the corresponding jacks of each section, all of the circuits being treated in like manner. The two wires of the talking circuit, tip and ring are shown twisted together so as to be balanced to the adjacent circuits and thereby prevent "cross talk." The third wire, to the sleeve, does not have any connection with the talking circuit, and is therefore single.

The main reason for arranging the multiple cables in layers is to facilitate the removal of a strip of jacks after the switchboard is installed. Fig. 52 shows a strip removed from the rear of the section, which is accomplished by forcing up all of the cables above

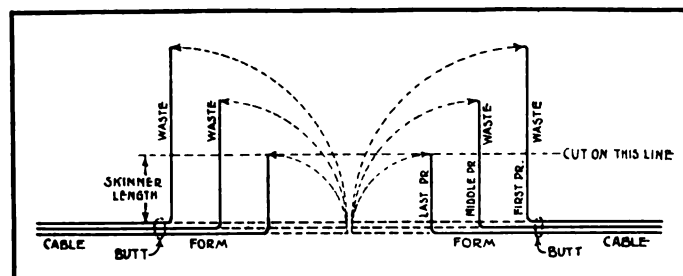


Figure 53. A Method of Making "Skinners."

the layer desired. This operation is only necessary when serious trouble occurs in a strip of jacks or its wiring, which with well-designed and constructed modern switchboards is of very rare occurrence.

The reason for the various section shapes of multiple cable is now apparent. To keep the layers of cable from piling up higher than the rows of jacks to which they are attached it becomes necessary to flatten the cable, and in some cases where a small-sized jack is used, to make the cable in practically a ribbon shape, for the width of the layer of cable is secondary in importance to the height.

The wiring of the multiple requires *long cable runs* from the intermediate distributing frame to the first switchboard section, then come what are called *short multiple cables* between the jacks of the sections. This cutting a length of cable into long and short runs is to facilitate the mechanical operations of bringing out the wires and soldering to the jacks.

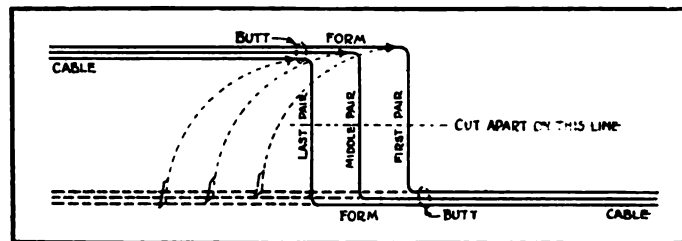


Figure 54. Another Method of Making "Skinners."

Referring to Fig. 51-A, it can be seen that the looping-in wires must be of different lengths, depending on the location of the cable in the layer; those nearest the jacks being from 3 to 5 inches in length, according to the design and construction of the switchboard section, while those of each succeeding cable being long enough to reach over the intervening cables to the jacks. For a six-panel board there would be a corresponding number of lengths of looping-in wires, commonly known as *skinners*. Strictly speaking, the *skinner* is the unskinned portion of the looping-in wire, or the distance from the cable to the terminal of the jack, the

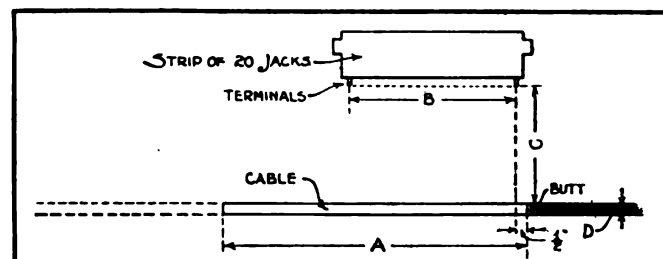


Figure 55. Lengths of Necessary Wire.

total length of wire being about one inch longer to provide a bare portion for easy connecting and soldering.

MULTIPLE FORMING: There are two methods of forming multiple cable. The first requires the cable to be cut in lengths and then formed at each end similarly to the operations described in a previous article on cabling. The second, or double forming method, requires the entire cable run to be first formed over double forms where the wires are to loop out for connecting to the jacks and then cut through the formed portion into separate lengths, thereby avoiding any waste excepting at the ends of the original length.

These methods are shown graphically in Figs. 53 and 54. The

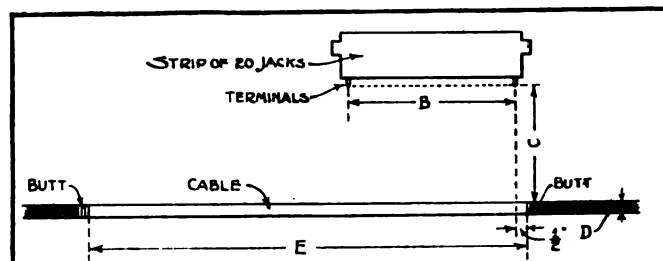


Figure 56. Lengths in Double Form Method.

first, middle and last pairs of wires of the cable are used in the diagrams to prevent confusion, as it is understood that the intervening wires come within these limits. The broken lines represent the cable pairs before forming, while the dotted lines trace them to their formed position. The first method, Fig. 53, shows the waste ends of the formed wires that will have to be cut off in order to give uniform skinner lengths. Fig. 54 shows a cable formed by the second method, which does not cut to waste when separated as indicated. Two complete forms are the result.

The actual length of cable required in making a single form, used in the first method, is derived as follows: The relative posi-

tions of the strip of jacks and cable to be connected to it are shown in Fig. 55, in which

A = "Stripper" length or length of cable required for forming, from butt to end, given in inches.

B = Length of a strip of jacks, or distance in inches between the terminals of the first and last jacks of a strip.

C = Skinner length, or distance in inches from the cable to the terminals of the jacks.

D = Cable diameter, taken as a horizontal measurement and given in inches.

One-half inch is to be added to the value of B to offset the cable butt, from where the first pair of wires breaks off in forming the cable, thus giving $(B + \frac{1}{2})$.

Also one inch is to be added to the value of C to provide for the bare portion on the ends of the wires for soldering purposes, thus giving $(C + 1)$.

Then: Form No. 1, $A = B + C + 1\frac{1}{2}$;

Form No. 2, $A = B + C + D + 1\frac{1}{2}$;

Form No. 3, $A = B + C + 2D + 1\frac{1}{2}$, etc.

These equations refer to the method of Figure 55.

The length of cable required in making the double form by the second method is derived from Fig. 56, in which B, C and D refer to the same details as given under the first method.

E = stripper length, or length of cable between butts, to be used in making a double form, given in inches.

Then for:

Form No. 1, $E = B + 2(C + 1\frac{1}{2}) = B + 2C + 3$;

Form No. 2, $E = B + 2(C + D + 1\frac{1}{2}) = B + 2C + 2D + 3$;

Form No. 3, $E = B + 2(C + 2D + 1\frac{1}{2}) = B + 2C + 4D + 3$; etc.

In order to compare the stripper length of the single form with that of the double it will be necessary to multiply the value of A by 2 to make it equivalent to that of E.

Then two simple forms, $2A = 2B + 2C + 3$;

and one double form, $E = B + 2C + 3$.

This gives an extra length of cable equal to B in the first method, over and above that used in the second method, for looping the wires into each strip of jacks. The waste cable B is equivalent to the length of a strip of jacks.

CIRCUITS AND OPERATION OF A COMMON BATTERY BRANCH EXCHANGE

By HARVEY SPROUL.

THE branch exchange switchboards of the common battery type in use at the present time, usually consist of either a one-position switchboard, with a capacity of 100 lines or a two-position board having a capacity of 200 lines. The battery for talking purposes and for operating the signals, is usually furnished to the branch over conductors from the central office, alternating current for ringing purposes being furnished in the same way.

drawing, each winding having a resistance of about 40 ohms. These windings are connected to the cord circuit through the cut-off relay contacts when the relay is in its normal condition, the non-grounded side of the battery being connected to the ring strand of the cord and the grounded side connected to the tip strand, thus bridging the battery across the cords.

Battery is connected to the sleeve strand of the cords through the winding of the cut-off relay as shown in the drawing.

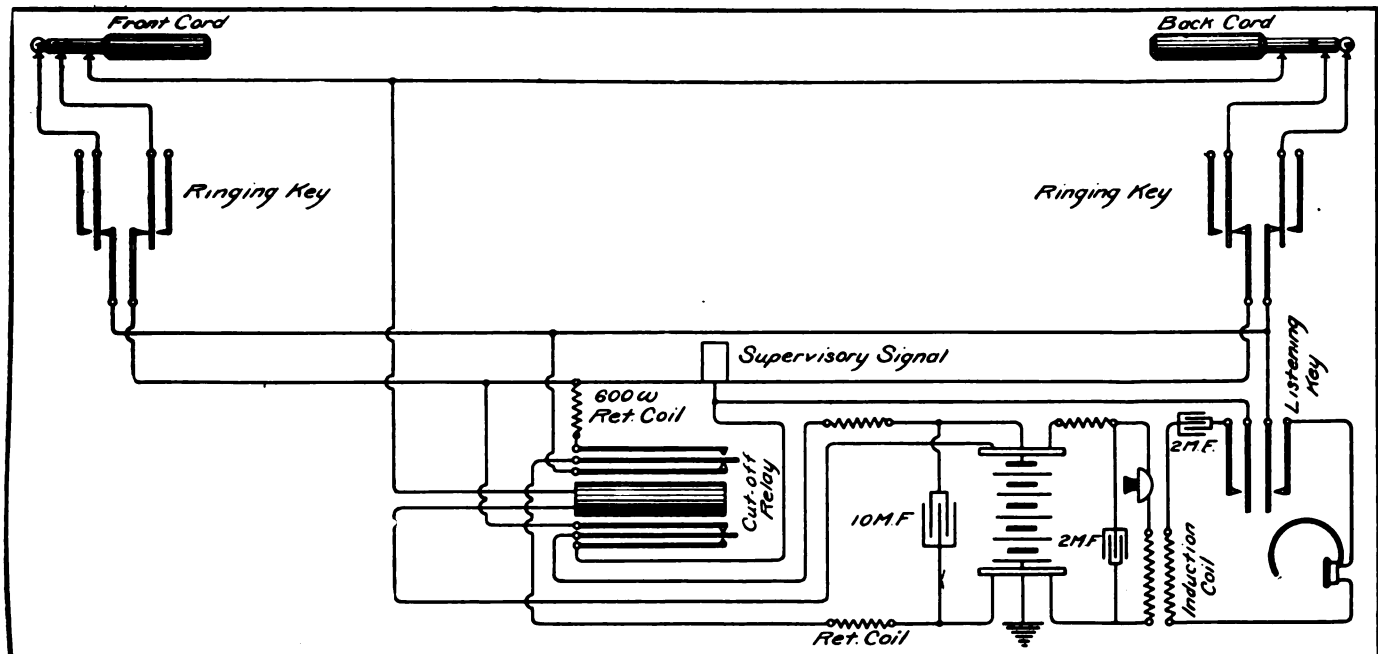


Figure 1. Wiring Diagram of Connecting Cord Circuit.

In Fig. 1 is shown a wiring diagram of the connecting cord circuit. Fig. 2 shows the method of wiring the sub-stations and their connection to the switchboard and Fig. 3 shows the wiring of the trunk line circuit from the central office to the branch exchange. The cord circuit is equipped with two ringing keys, one on either cord and one supervisory signal which is connected in series in one side of the circuit as shown in Fig. 1. The supervisory signal has its winding tapped at the central point and this tap connected to one of the conductors of a cut-off relay, one such relay being used in the circuit of each pair of cords. The battery current is furnished to the cord circuits through the windings of a double wound retardation coil, as shown in the

The listening key is connected in the circuit, as shown, and a switching key is provided in order to enable ringing current furnished by a hand generator to be used when desirable. A 600-ohm retardation coil is connected to the ring strand of the cords, its free terminal being connected to one of the relay contacts, as shown; the object of this coil will be explained later. The instruments used at the sub-stations are of the regular common battery type and are connected directly to the outer springs of four point jacks at the switchboard, one of the inner springs of all the line jacks is connected to battery, the other spring being connected to one terminal of the winding of the line signal, the free terminal of the signal being grounded.

A night-bell or buzzer is wired in series with a battery through the contacts of a switching key, so that its circuit is closed by the shutter of the line signal when the signal is operated and the switching key in the proper position. The trunk lines, between the branch and the central office, consist, at the central office end, of the regular common battery arrangement for subscribers' lines and at the branch end, the trunk line

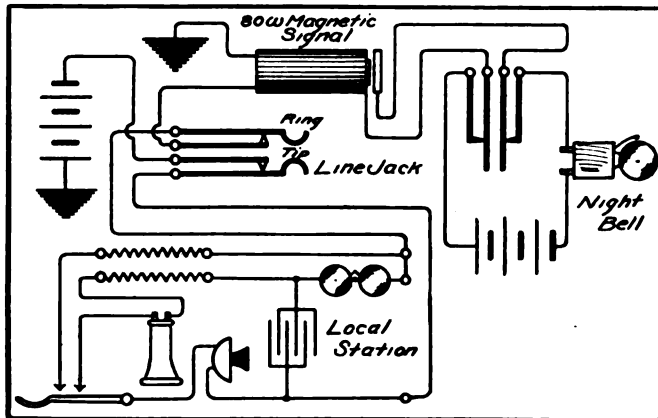


Figure 2. Method of Sub-Station Wiring.

terminates in the outer springs of a four-point jack, the inner springs being connected to the terminals of the winding of a 500-ohm tubular drop, as shown in Fig. 3, a condenser being inserted in one side of the connecting line, as shown. The sleeve of the trunk jack is grounded through a 30-ohm resistance coil. The operation of the board on local calls is as follows: When the receiver is removed, at one of the extension stations, current flows from the battery; through the contacts of the jack; over the line and through the calling instrument and back through the jack contacts and winding of the line signal to ground,

supervisory signal is always under the control of the instrument connected to the back cord and as the back cord is used for answering purposes only, the disconnect signal is not given until the telephone is hung up at the station at which the call originated. On calls to the central office over a trunk line, the branch operator signals the central by placing the front plug of a pair in a trunk jack. Current then flows from the branch exchange battery supply; through the winding of the cut-off relay; through the sleeve of the front plug; through the sleeve of the trunk jack and 30-ohm resistance coil to ground, thus operating the cut-off relay and connecting the 600-ohm retardation coil to the ground through the relay contacts.

Current then flows from the central office battery, through the winding of the line relay, and contacts of the cut-off relay, over the trunk line to the branch; through the jack to the ring conductor of the plug and thence through the 600-ohm retardation coil to the ground, thus operating the line relay; lighting the line signal and notifying the central office operator. On calls from the central office to the branch the operator, at the main exchange rings on a trunk line and thus throws the drop at the branch exchange. The condenser is connected in series with the trunk drop in order to prevent the constant flow of current from the central office battery over the line and through the drop, as in this case the line relay at the central office would be continually energized and thus the line signal kept constantly lighted and the drop at the branch exchange always down. It is of course due to the insertion of this condenser that it is necessary for the central office operator to ring in order to signal the branch. The branch exchange operator answers all incoming calls over trunks and completes all outgoing calls over trunks with the front cord and in consequence the supervisory signal is always under the control of the branch exchange station, as when a station is connected to a trunk line the cut-off relay, in the cord circuit, is operated and the branch exchange battery supply connected in parallel with the battery at the central office.

Through the split winding of the supervisory, the operation

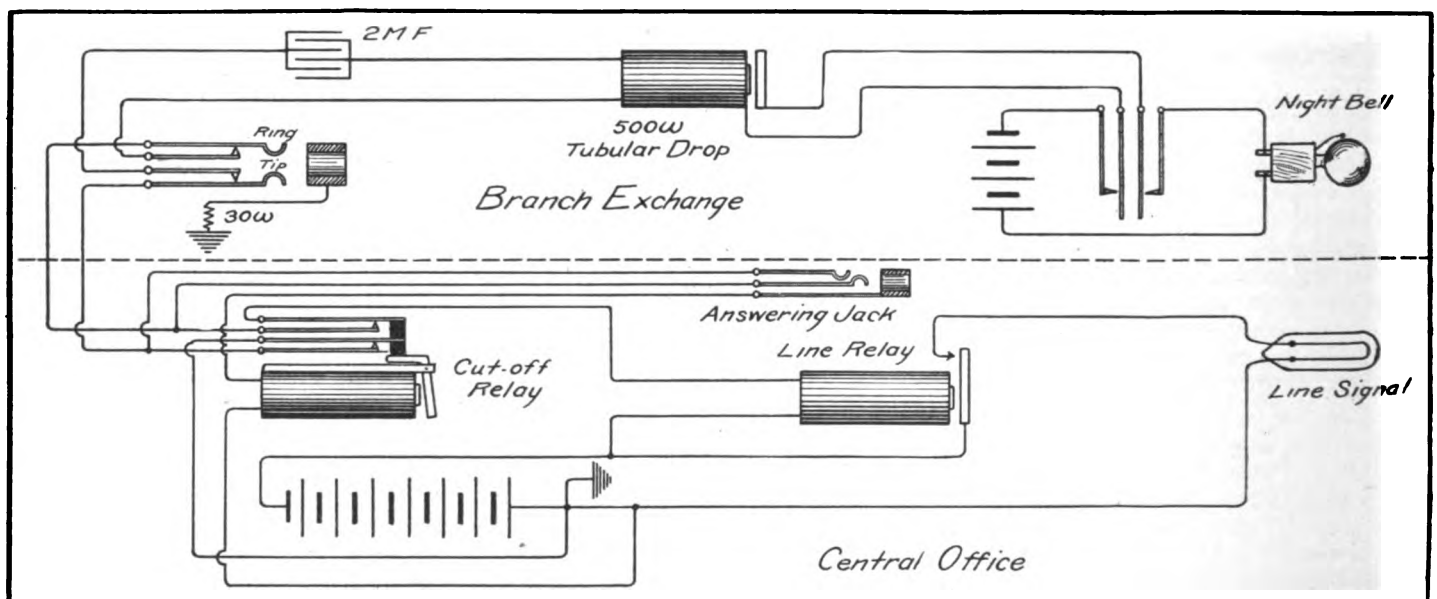


Figure 3. Trunk Line Wiring to Central Office.

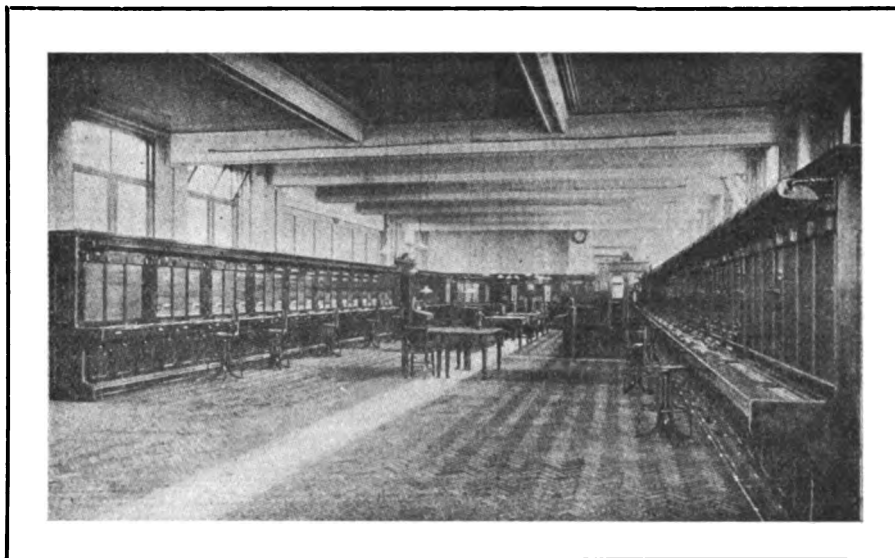
thus operating the signal and attracting the operator's attention.

The operator answers with the back cord of a pair and throwing the listening key, learns the connection desired. The required station is signalled by means of the front cord. As both of the connected stations, in the case being considered, are local stations, the sleeves of their jacks, are not grounded and the cut-off relay in the cord circuit is not operated, and consequently talking battery is furnished to the connected instruments through the retardation coils and relay contacts. As will be seen, from an inspection of Fig. 2, the

of the hook switch at the branch station, cuts off the current flowing through the supervisory signal and thus causes it to drop, and attract the attention of the operator. The supervisory signals used are of the girdiron visual type wound to a resistance of about 60 ohms; the line signals, for the extension stations, consist of 80-ohm magnetic signals, the shutters of which restore themselves by gravity. The trunk signals consist of the regular 500-ohm tubular drop. The 10 M. F. condenser which is bridged across the cord circuit, is used for the purpose of keeping down cross-talk.

NEW LONDON TRUNK EXCHANGE

FOR many years telephony in Great Britain has progressed slowly. This is partly due to English lethargy which takes life easily and slowly at its best and is reluctant to adapt itself to new inventions and new conditions, and partly to the fact that telephonic system in Great Britain has for many years been conspicuous by being under the control both of the municipal corporations and of the government. For these reasons it has been but recently that London has adopted the newer forms of switchboard, which are now in the United States old stories. About two years ago a new exchange was installed in London whereby city subscribers were given the benefit of modern switchboard devices and now the switchboard has been extended to embrace the trunk line system which serves the United Kingdom and extends as far as Brussels and Paris. The local switchboard, which was opened two years ago, was placed in a building known as the Central Local Exchange, or as we should say in this country, the toll board, and is situated in the same building on a floor below the office. Forty-two positions have been installed for toll operators, of this 37 will immediately be placed in operation.



Post Office Telephone Service. Interior of New Trunk Exchange.

The plan of the board is that of a three panel and two operator multiple. Five trunk circuits are placed in each of the outer panels and in these also are multiplied the trunk lines running to the various local exchanges. Five trunk lines are terminated in all of the branch offices. In each of the three panels carrying local trunk lines to the various branch offices appear a set of transfer trunks also arranged in such a manner that in operation they communicate with any other one so that the trunk lines appear from position to position all over the board. The center of the room is occupied by the recording operator's tables and the method of operating is similar to that employed in this country. That is to say, a subscriber calling for a toll line connection, is by the subscriber's operator extended to the recording operator who takes the subscriber's order and makes out a ticket. This is transmitted to the toll operator who gets the desired party and then calls the local subscriber. For inward work calls are passed from the toll operator direct to the subscriber without the intervention of the recording operator. Also in this respect the practice resembles that followed by telephone companies operating in America.

STRENUOUS POLE SETTING

SHELTERED under a large sheet of tarpaulin, a gang of workmen of one of the larger telephone companies dug holes and erected poles while their foreman stood by under a large umbrella directing his men, says a local newspaper. The placing of the poles was one of the most exciting incidents that has occurred for some time, and the police had to be called to maintain order. During the proceeding four women were routed, three men were arrested and the workmen were given a ducking.

When the telephone linemen began to dig holes in front of the property of our feminine citizen, she objected and tried to have the work stopped, but the foreman of the gang produced a permit issued by the public works department for the poles to be erected at certain spots.

Angered at the refusal of the foreman to change the location of the poles, our lady brought out a chair and placed it over the hole. The workmen dug several more holes, and as each was finished a daughter was directed to cover it with a chair and sit down.

In the meantime a crowd gathered to witness the struggle for supremacy. When the crowd jeered the workmen, the police were called upon for assistance. Our inspector responded with a squad, and after examining the foreman's permit, he consulted by telephone with the office of the public works department. On being assured the permit had been issued the women were dislodged from their positions. A son of the lady, immediately took one of the chairs vacated by the women, and when he was

dislodged by a policeman he fell against a workman of the telephone company and a scuffle ensued. He and the workman were sent to the police station in a patrol wagon. A spectator remonstrated with the police, and he was also arrested. The three men are charged with disorderly conduct.

While the inspector was distributing his officers about among the crowd, another of the lady's sons secured a garden hose and turned a stream of water upon the workmen. The boy was ordered to go inside his home by the police. Just when the men had again returned to their work on the post holes a thin stream of water began to descend upon them from a third-story window of the lady's house. The boy had carried his hose upstairs and was making effective use of it from his position of vantage. The telephone men were routed for a time, but when the sheet of tarpaulin was spread, although the men were soaking wet, and almost frozen from the severe cold, they went to work again on the holes. By the time it was evening the holes had been dug and the workmen withdrew from the scene of strife.

Another case is on record, in which a woman played an important rôle, in New York State. In this instance the woman, the wife of an owner of a suburban residence, was at home alone when the telephone construction crew appeared on the scene and prepared to set a pole in front of the house. They managed to get the hole dug, but then the woman jumped into it and refused to move until tally time, when the linemen retired, beaten.



THE INDEPENDENT TOLL LINES.

AS if to give emphasis to the recent editorial utterances in which *THE AMERICAN TELEPHONE JOURNAL* has called attention to the great possibilities in the direction of long distance Independent telephony, the news has come from Indianapolis of an enthusiastic meeting of long distance Independent operators. The matter has, therefore, been taken out of the domain of prophecy and even hope, and into the field of actual endeavor. The object of the meeting was not to discuss the future of Independent telephony, nor to formulate some plan whereby in time to come the Independent lines might be able to properly cover the country. The purpose of the meeting was to complete arrangements for connecting the various Independent lines East and West, already existing.

Here is a matter for congratulation on the part of Independent operators everywhere and the public in general. When the arrangements there entered into are carried out the Bell Telephone Company will have no excuse for existing as far as the needs of the public are concerned. The only effective argument in favor of Bell lines will have been removed, and subsequent events will squeeze the water out of Bell securities even faster than has been done during the past few years.

Heretofore, business men wishing to have telephonic communication with a distant commercial center, Chicago, for instance, have been forced to use Bell lines because there have been no other. Bell lines have been necessary until recently for long distance connections in nearly every direction. Such an argument, with men having any relation whatever with the commercial world, has been simply unanswerable. While using the Independent telephone for local purposes, business men have felt it absolutely necessary to retain their Bell telephones in order to reach the trade and the wholesale houses in distant cities. No matter how good the Independent service was locally and no matter how reasonable the charges, here was a condition of affairs which could not be overcome, except by the slow processes of time. Even in the merely social use of the telephone, a use which is becoming of greater and greater importance, the lack of long distance connections has been a serious handicap for the Independent companies.

The wonder is that under these conditions Independent telephony has been able to progress at all, to say nothing of making such tremendous strides. Had the Bell companies, enjoying a perfect monopoly and with an absolutely dependent public, seen fit to properly cover the field and give service and rates which they are now willing to give under the stimulus of an aggressive competition, the history of Independent telephony must have been a decidedly different story.

In the nature of things, there would have been room and encouragement for mutual companies in districts remote from Bell centers, which companies in time would have become important feeders for the Bell system. But that Independent companies, often without adequate capital, could invade active Bell terri-

SOME SMALL GAPS ARE CLOSED.

tory without being able to offer long distance service, and at such great odds could successfully compete with the Bell Company for the natural business of the district, can be explained

only on the theory that "whom the gods would destroy they first make mad."

It is an easy matter now to see all this, and the probabilities are that the Independent companies have builded better than they knew. An analysis of the causes leading to the present encouraging conditions is not necessary. What we are all interested in, even the Bell people, is the fact that on the 19th day of March, 1904, there was a meeting of representative Independent long distance lines at Indianapolis, and the further information that "plans were made which will give the Independent lines connection between Philadelphia and Buffalo on the east, Topeka on the west, Texas on the south, and Minnesota on the north."

That meeting is the high water mark in this astonishing flood known as Independent telephony. But the flood is still rising. The United States Telephone Company announces its intention to at once build the forty-mile gap between Dayton, Ohio, and Richmond, Indiana. These forty miles will complete the connection to St. Louis, and Philadelphia will be able to talk with the Louisiana Purchase Exposition over Independent lines, and, what is more to the point, at Independent rates. Two more small gaps will be filled and the East will have a through line to Chicago. From Chicago connection can be made with St. Paul and Minneapolis. From St. Louis, Kansas City and the Southwest can be reached.

The Independent companies are fortunate in one respect. They are able to profit by the errors of the Bell Company as well as by their own earlier mistakes. The great mistake of the Bell monopoly was greed. Greed watered the stock and sought dividends that were inordinately high. Greed maintained an inferior service. Greed boosted the rates almost to the prohibitive limit. As long as Independents bear these facts in mind and contenting themselves with reasonable dividends make good service their watchword, the future will be secure.

Telephony is yet in its infancy. A few years ago it was an experiment; before that, a dream; before that, an unrecognized possibility. What the future has in store cannot be determined now, no more than it could then. But of one thing we may be certain, the future of telephony will be great. More and more will the telephone enter into the business and social affairs of men. This is the wire age. Over these slender paths, radiating from every town and hamlet, travels the invisible thoughts of the nation. More and more will this be true. Soon our voices will reach into every nook and corner of this great country, will reach under the oceans and they will travel along Independent wires. The experimental period has passed. The Independent companies deserve and they have the confidence of the public, and they mean to retain it.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

NO INTERVENING NEGLIGENCE.

A TEAM of horses ran away and collided with a telephone pole belonging to our company and struck it with such force that it was broken clear off. In falling it injured a peddler's wagon. The pole was set six feet from the roadway in accordance with an ordinance of the city. Is our company liable for the injury to the wagon? L. A. G.

THERE is no such liability. If there was any negligence in the case it was attributable to the owner of the runaway horses. The fact that his negligence used your pole as a means of transmitting injury to the peddler's wagon does not make you responsible in any way. See *Allen vs. Atlantic & P. Teleg. Co.*, 21 Hun. 22.

NOT CONTRARY TO PUBLIC POLICY.

CAN our company and another Independent company in the same town legally make an agreement to divide profits and expenses? We are told such an agreement would be against public policy and therefore void. There is a Bell company in the city and this will enable us to make a better fight against it. Please give us a careful answer. T. B. C.

YOU can legally make such a contract, there being no attempt at monopoly or restraint of trade therein. A similar contract was upheld in *Benedict vs. Western Union Telegraph Co.*, 9 Abb. N. C. 214, a New York case.

A DECISION IN TAXATION.

THE Nebraska Telephone Company appealed to the Nebraska State Board of Equalization regarding the section of the tax law of that State which provides that the telephone company shall make report of its property to "local assessors." The company contended that this should be construed to mean "county assessors." The board decided that the company must make its return not only to the county assessor but to the "local" or deputy assessor as well. The decision also gives the county assessor authority to use the report in instructing his deputies. Should the assessor desire to do so under this ruling, he could give the deputies returns from the report made to him. It was argued that the county assessors could use the report as a check on the company and on his deputies.

The decision means considerable expense and much trouble to the company. If local assessor meant county assessor, then there would be only ninety returns to be made out. It being the other way, then 1,000 returns will have to be made.

FORFEITURE OF DEPOSIT.

IN the franchise of the People's Telephone Company of Detroit, Mich., it was provided that the company should deposit with the city controller, a certificate of deposit for \$5,000 as a guaranty for the construction of its plant. This sum was to be forfeited to the city unless the company should procure 3,500 bona fide subscribers in the city within the city limits within four months from the acceptance of the franchise, and unless the plant was in operation within fifteen months from July 1, 1901. The common council of the city afterwards, by resolution, declared the check forfeited and collected the proceeds. In a suit against the company for \$1,529 inspection charges, the company as a set-off sought to recover the \$5,000. The evidence showed that the company had, within the required time, procured the 3,500 subscribers, but had not operated the system put in by it with the exception of some thirty telephones placed in an interior exchange at a manufacturing company's plant. It was also shown that the company was not in position at the time of the trial to supply any more patrons with telephones.

The contention of the company was that for any breach of the conditions of the franchise the city was only entitled to such compensation and damages as it could be shown to have suffered by reason of the default of the telephone company, and that as no such damages were shown it was entitled to recover the amount.

The court held that the municipal corporation, as such, suffered no damages by reason of the failure of the company to comply with the terms of the grant; but that the contract was made in the interest of the inhabitants. Their damages being not susceptible of proof, there was strong reason for holding that the parties intended by their stipulation as liquidated damages. The Supreme Court therefore sustained a verdict for the city and did not allow the set-off pleaded by the company. *Detroit vs. People's Telephone Company*, 10 Detroit Legal News, 935.

INDIANA MAY HAVE NOVEL LAW.

THE farmers of Indiana are preparing to ask the next legislature for considerable telephone legislation. Among the laws to be asked for one will be for what they call a "free telephone law," an act similar to the present free gravel road law. The bill they have prepared provides that when fifty freeholders of any township in Indiana desiring free telephone service petition the Board of County Commissioners, describing on what pike or highways it is to be located, the kind of poles, wire, telephones, switchboard, etc., are to be used, the Commissioners shall advertise the improvement, appoint viewers to estimate the costs, advertise for bids, let contract, and sell bonds for the construction, etc. The bill provides for connecting with adjoining townships, having the same system and also with city, long-distance and other private telephone companies, inasmuch as they will be mutually benefited. Under this bill patrons are required to purchase their own telephones and keep them in repair, just as they own their boxes in free mail delivery and just as they have to furnish their own private road and teams, vehicles, etc., to get the use and benefit of the free gravel pikes in front of their homes.

MUST TAKE LAND, NOT RIGHT OF WAY.

AT the session of the circuit court at Wheeling, W. Va., the case of the National Telephone Company against William Buchanan, a farmer residing in the neighborhood of Ronney's Point, was disposed of. Proceedings toward the condemnation of a right of way for the erection of a telephone line over the defendant's farm were taken by the telephone company some time ago. The company claimed that the work would require the setting of 28 poles on the defendant's farm, and that they had tried to reach an agreement with him as to the price of the right of way, but were unsuccessful. The court, in accordance with the plaintiff's request, appointed commissioners to fix a price.

The Court ruled that the company could not have a mere right of way condemned, but that the requisite land must be taken.

BILL TO LIMIT LIABILITY.

AS a result of the decision of the Massachusetts Supreme Court in the case of *Riley vs. New England Telephone and Telegraph Company*, 68 N. E. 17, that the company is liable to persons traveling on the highway where their injuries are due to colliding with poles in the road, an attempt is being made to limit the company's liability. A bill is now before the Massachusetts Legislature with that end in view.



IN THE OPERATING FIELD.

KEMPSTER B. MILLER AND SAMUEL G. McMEEN,
CONSULTING ENGINEERS.

THE Independent telephone fraternity will be pleased to learn that about April 25th Kempster B. Miller and S. G. McMeen will open an office as consulting engineers at Suite 1442 and 1443, Monadnock Block, Chicago. In the capacity of consulting engineers and as solicitors of patents they will be associated and in the capacities of experts in patents they will act individually.

Samuel G. McMeen has been for the last two years engineer with the Western Electric Company, in charge of telephone exchange equipments. Previously for seventeen years, since leaving Purdue University, he has served as chief engineer, assistant engineer, and in various capacities in the operating, construction and engineering departments of the Central Union (Bell) Telephone Company. Nine years of this time were spent in the company's headquarters in Chicago and eight in the field, in Ohio, Indiana, Illinois and Iowa. Mr. McMeen's long and varied experience peculiarly fits him to meet the problems his new work will develop. He has lately completed a study of the telephone conditions of the City of Mexico, preparing complete plans and specifications for an extensive underground conduit and cable system and a wholly new equipment for that important capital.

Kempster B. Miller graduated from Cornell in 1893 and is known the telephone world over as the author of "American Telephone Practice." He has been with the Kellogg Switchboard & Supply Company for the past four years. Before that he was for one year with the International Correspondence Schools, in which connection he prepared the text books of that institution on the subjects of "Telephony" and "Telegraphy." Also he has served as chief electrician of the Western Telephone Construction Company; with the Westinghouse Electric & Manufacturing Company; in the United States Patent Office, three years, in charge of the class of Telephony in the Electrical Division; as draughtsman and inspector of drawings in the draughting room of the Thomson-Houston Electric Company, Lynn, Massachusetts. Mr. Miller has served as expert in many important patent causes and his ability in analysis of this sort is marked and well known.

THE EVANSVILLE INDEPENDENT MEETING.

THAT Evansville is regarded by all interested in the telephone business as one of the most conspicuous battlegrounds of the war to the death now on between the Cumberland-Bell and the Independents was again signalized by a secret and hurriedly called meeting of the telephone managers of southern Indiana and Kentucky at Evansville, March 23d. Evansville is the missing and needed link to unite the Indiana Independents to the Kentucky Independents. A victory, therefore, in Evansville will have a far more reaching effect than the mere installing of a city service; it will be a crushing blow to the Bell interests and supply a profitable and naturally located meeting place for the network of Northern and Southern lines.

At the convention the adjustment of tariff rates over long distance lines in Indiana and Kentucky was the principal theme of discussion. It was decided to organize a traffic bureau or, properly speaking, a clearing house to represent the various plants interested in the movement for better protection.

Decision was also made to close up gaps between certain exchanges in order to give better connection to the long distance company. All connections will be double, so that in case of accident on one circuit another can be utilized.

Agreements were entered into whereby lines are to be constructed from Paducah, Ky., to Clarksville, Jackson, and Memphis, Tenn., also a line from Hopkinsville to Henderson, Ky., another from Mt. Vernon to Princeton, Ind., and still another from Paducah to Cairo, Ill. It was also decided to run additional circuits on the poles of lines already in use.

It will be noticed that the perfecting of long distance connections around and between Evansville is the tenor of the proposed

"TELEPHONE OFFICE"
AS WRITTEN BY A CHINAMAN

NEW CHWANG DIALECT	MANDARIN DIALECT	講 電 音 公 司	ENGLISH TRANSLATION
KO	CHIANG		SPEAK
DEN	TIEN		LIGHTNING
OU	YIN		SOUNDS
KO	KUG		PUBLIC
SHEE	SZU		COMPANY

CHINESE TELEPHONE SIGN.

The Orientals are great users of the telephone, as the telegraph is not adapted to their alphabets. Telegraph messages must be translated into some modern language and interpreted back after transmission. The above reproduction shows the Chinese sign for a telephone office. The pronunciation of the two common dialects and the English translation is also given.

improvements and constructions. The Independent dealers realize that whenever such arrangements are completed there will no longer be any excuse for any one in the city of Evansville to hold up for the Cumberland-Bell on account of its supposed superiority of long distance service.

With the proposed arrangement installed it can be shown this dissenting element that they can get to twice as many customers by the Independent lines and do it cheaper. Then they will not only cease to oppose the new company which holds the only legal franchise to the city, but will enter an emphatic demand that they have its service and have it quick. Thus all the Independent men in Kentucky and Indiana are vitally interested in the installation of the Evansville plant, and they are thus by conventions and plans assisting the managers of that legally beleaguered company and bringing all the pressure they can to bear on that point to simply, by an overwhelming superiority, crush the Bell Company.

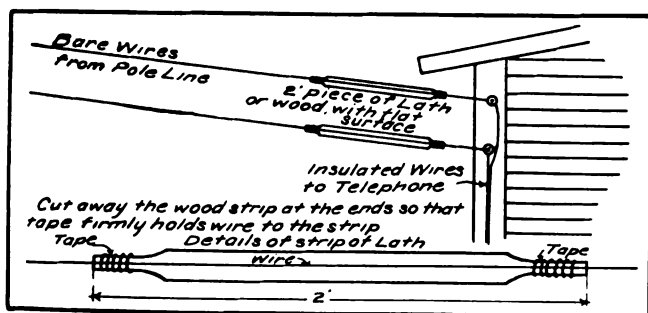
Those out of town attending the meeting were in part: J. A. Armstrong, Louisville, Ky.; Henry Landgrabe, and Philip Dilly,

Huntingburg, Ind.; C. W. Halbrage, C. B. Laird, A. J. Peyton, J. C. Haines, Rockport, Indiana; C. H. Webb, P. K. Heuring, Petersburg, Ind.; W. A. McGregor, C. M. McGregor, Mt. Vernon, Ind.; W. M. Ford, New Harmony, Ind.; N. D. Smith, Paducah, Ky.; J. G. Taylor, Morganfield, Ky.; A. W. Hodge, Hopkinsville, Ky.; A. Waller, Henderson, Ky.; W. G. Turpin, Henderson, Ky.; W. M. Oliver, Benton, Ky.; J. H. Parrish, H. K. Cole, Owensboro, Ky.

Shortly after the meeting was adjourned it was announced in the hotel lobbies by a telegram from Oakland City, Ind., that the council there had granted a franchise to the Ohio Valley Home Telephone Company over the vehement protests of the Bell Company. As most of the promoters of the Ohio Company are Evansville men and were present at the time the telegram was read, the news of their victory was the occasion of a burst of enthusiasm from all the Independents assembled. A leader mounted a chair and proposed three cheers for the new company, and they rang out from a hundred throats in a shout of triumph.

ANOTHER ANTI-HUM DEVICE.

E. MILLER, manager of the Warren & Niles Telephone Company of Warren, Ohio, suggests the device which the cut illustrates to prevent humming of the telephone wires where they are attached to buildings. He says: "On our own farmer lines here where the service wire is long and tightly



drawn, we have found the most effective and simplest device to stop the humming is to tape fast to each wire, close to where it is knobbled to the house, a 2-foot piece of lath or flat strip of wood. It works well. The materials are always at hand and cost nothing." The drawing shows Mr. Miller's plan.

TWENTY TOLL LINES BETWEEN ST. JOSEPH AND KANSAS CITY.

TWENTY long distance wires will connect the Citizens' Telephone Company, of St. Joseph, Mo., with the Home Company, of Kansas City. J. E. Zeluff, of the Western Independent Telephone Construction Company, which is building the lines, was in St. Joseph recently on business relating to establishing connections between the new Home Telephone Company's lines in Kansas City and the Citizens' Telephone Company's lines in St. Joseph. "There will be twenty long distance lines between St. Joseph and Kansas City, when we are done," said Mr. Zeluff. "Ten of these lines will be direct, and ten of them will have connections with Atchison, Leavenworth and other towns between the two places. This will give our companies the best connections afforded. When these connecting lines are completed we also expect to extend the connections to the country north of St. Joseph and give the farm lines connection with this city and Kansas City."

NEWARK, NEW YORK, COMPANY INCORPORATED.

THE Newark Telephone Exchange, of Newark, New York, was incorporated recently under the laws of the State of New York, with \$25,000 capital, including \$5,000 of preferred stock, which will bear 6 per cent. interest. This corporation will purchase the local telephone service established in

Newark by W. H. Kelley, and now operated by him. This exchange has been a success, and now has 228 telephones. The exchange also has direct connection with Rochester, Canandaigua, Buffalo, Geneva, besides all the towns in the eastern and northern parts of Wayne County. In the spring connections will be made with Palmyra and other western towns. The proceeds from the sale of stock will be used to purchase a new switchboard, more cable and new fixtures, and to otherwise improve the service. The income of the company is now sufficient to pay all fixed charges, which fact makes the preferred stock a good 6 per cent. investment. The business men are quite generally taking this stock. The directors of the new corporation are W. H. Kelley, J. E. Pulver, E. A. Smith, E. P. Thatcher, J. P. Ballou, F. D. Burgess, Albert Proseus.

TROUBLE FOR BELL AT NEW DECATUR, ALA.

THERE is trouble in the telephone world of New Decatur, Ala., the matter having just assumed an acute phase by the City Council ordering the Southern Bell Company, the American Telephone & Telegraph Company, and the American Telephone & Telegraph Company, of Alabama, to remove their poles and wires from the streets and alleys of the city and evacuate. In June, 1898, the Council granted a franchise to the American Telephone & Telegraph Company, of Alabama, to do a long-distance business. At that time the Southern Bell Company was doing a local business under a charter. Since then that charter has expired, and the Southern Bell asked a renewal, but the City Council declined to grant it. The Bell Company was ordered to remove its poles and wires, but refused to do so, and continued to do business under the name of the American Telephone & Telegraph Company, of Alabama, which company had been granted a franchise as stated above, the Bell people claiming that the American Telephone & Telegraph Company of Alabama was themselves. The City Council has just passed an ordinance repealing all the franchises heretofore granted to telephone companies, except that to the Morgan County Telephone Company, Independent, which has been operating an exchange at New Decatur for about a year and giving fine service. It has forced the Southern Bell to reduce its charges. Injunctions and other legal methods are likely to be resorted to by the Bell people, and extended litigation will probably follow.

MERCHANTS DISCARD BELL TELEPHONES AT JONESBORO, IND.

A WAR has been declared on the Bell Company by merchants of Jonesboro and people generally at Princeton, Indiana. The Independent service in Princeton is so much superior to the Bell that many Bell subscribers are having their telephones taken out and Independent instruments installed. The merchants did not care to pay for two telephones, and adopted the Independent because of the superior service. The merchants held a meeting, which resulted in an order to have the Bell telephones taken out of their places of business. A resolution was passed to the effect that any merchant in the future, who uses a Bell telephone in his place of business or in his home, will be expelled from the merchants' association. The Bell Company is now threatening to lease or build a large building in Jonesboro to enter the mercantile business by establishing a large department store, with a view of underselling the recalcitrant merchants who have discarded its telephones.

WOLCOTT, N. Y., BESIEGED WITH RURALS.

NINE rural telephone lines in process of construction, or about to be built about Wolcott, N. Y., are seeking permission to enter the village. If all were to enter on separate lines the streets would be like a gigantic picket fence, but the village board insists on their being consolidated. In spite of the great depth of snow, farmers are busily engaged in drawing poles ready to be set as soon as the weather permits, and in some instances wires are being strung where poles were erected late last fall.

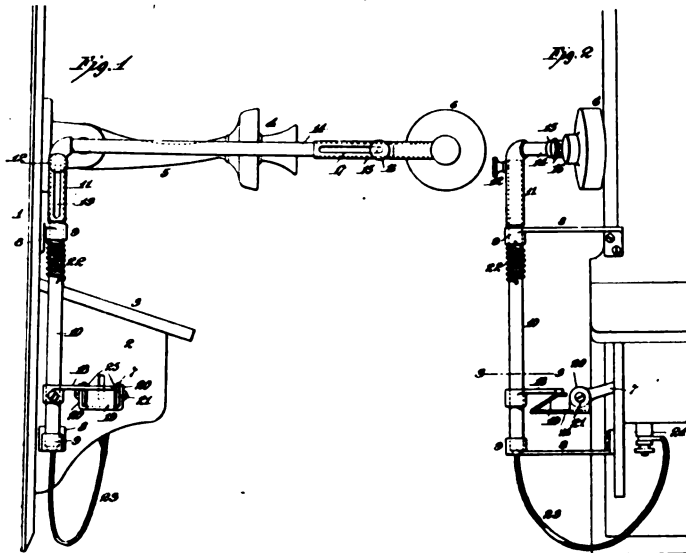
TELEPHONE



PATENTS

TELEPHONE RECEIVER SUPPORT.

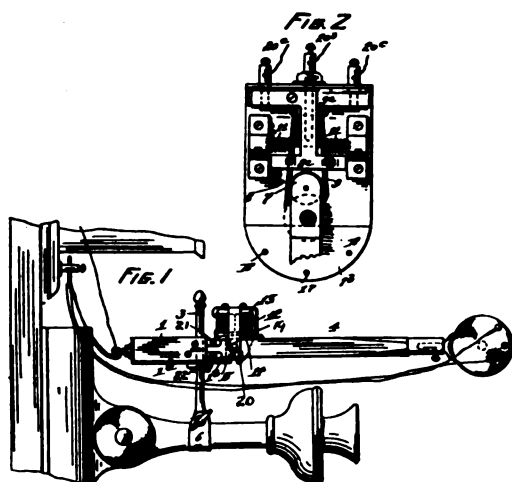
G. B. Buchanan, Haverstraw, N. Y., patents (No. 752,649) an improved attachment for supporting telephone receivers. The object of this invention is to provide a method for supporting a telephone receiver, which may be readily applied to any sub-station set and to avoid the necessity of the subscriber's holding the receiver to the ear. This invention is shown in Figs. 1 and 2, from which it will be perceived that there is an arm, 14, which is supported in the standards, 9, in such a manner that it may be swung



to and fro at pleasure. The end of this arm carries a sliding piece, 17, to which the receiver is secured, and by this means it may be adjusted to the ear. The lower part of the arm 10 carries a lever, 18, which operates the switch-hook, and thus by swinging the receiver to and fro the hook may be raised or lowered in the same manner as if it was used to sustain the receiver.

TELEPHONE SYSTEM.

S. C. Houghton, San Francisco, Cal., patents (No. 753,493) a device for remedying the difficulty which arises when the subscriber fails to replace the receiver on the hook, after conversa-

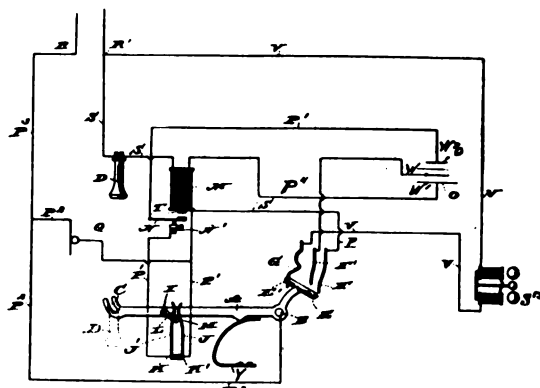


tion is completed. This invention is shown in Figs. 1 and 2. Reduced to its essential elements Mr. Houghton provides an arm 4 (Fig. 1) which supports the receiver at its outer end. This arm is pivoted upon a standard, 3, clamped to the transmitter arm by means of the sleeve 6. By means of the rod 3 the receiver arm can swing horizontally and can also be raised and lowered vertically to any convenient height. At the end of the arm is a box-like structure, which is shown enlarged in Fig. 2. This structure

contains a pair of springs 8 and 9 which serve to connect the receiver circuit with the rest of the telephone line, when the arm is swung either to the left or to the right. There is also an electromagnet 13 whose armature carries a pin that forms a releasing mechanism. If the subscriber fails to return the receiver arm to its normal position the central station operator can excite the electromagnet 12 and operate the releasing mechanism, enabling the springs 11 of contacts 2 to return the arm to its normal and proper position.

TELEPHONE SIGNALLING DEVICE.

O. O. Lee, Chicago, Ill., patents (No. 752,909) an improved method of signalling from subscribers' substations. The object of the invention is to provide a method whereby signals may be sent and the use of a magneto or other similar device avoided. The invention is shown in the figure in which the switch-hook is shown at



A. This is provided with three contacts on its rear end, G, F and F'. There are also two contact springs, J and J', which are operated by means of a pin, I, upon the switchhook. The induction coil M is provided with an armature N and a contact N'. It is easy to see by tracing the circuit that the local battery O is so arranged that when the switch-hook rises and the stud I completes the connection between the springs J and J', the current is sent out over the line and through the induction coil at the other station. This converts the induction coil into a buzzer, and causes the receiver to sound, thereby notifying the subscriber that his presence at the telephone is desired.

ANTISEPTIC ATTACHMENT.

J. Blum, Baltimore, Md., patents (No. 754,041). The object of this invention is to prevent the lips from touching the transmitter mouthpiece. The inventor provides an annular ring, which is sprung over the transmitter funnel. This ring contains a series of projecting wires about an inch long, which are terminated in smooth round balls, and thus the lips are prevented from being placed in too close proximity to the transmitter.

IMPROVED PARTY LINE SYSTEM.

Carl H. Prött, of Rheydt, Germany, patents (No. 754,011) an improved party line system. This invention falls to the category of step-by-step party line systems. The electro magnet is pivoted on each station which rotates the commutator. Every impulse sent to each station rotates the commutator one notch, and hence any station may be selective.

ANTISEPTIC TELEPHONE MOUTHPIECE.

W. M. English and A. H. Ten Broeck, of San Francisco, Cal., patent (No. 754,646) an improved antiseptic mouthpiece. The inventors modify the ordinary rubber trumpet which forms the mouthpiece or a transmitter by forming thereon a receptacle of the rubber, which is closed by means of a cap. This receptacle is filled with the desired antiseptic.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



WHAT IS A HOLDING COIL?—(307.)

What is meant by a holding coil, and what is its use?

R. N. O.

The holding coil is used principally in connection with lines from the wire chief's desk or manager's desk to the switchboard, the object being to provide an arrangement whereby the party at the desk may be able, while having a connection on one line, to take up a new connection and at the same time hold the previous connection as long as desired. If it were not for the holding coil, when the desk operator disconnected from a line, the supervisory signal at

stances, the introduction of condensers does not open the circuit, and innumerable difficulties are likely to creep in in any arrangement of this kind. Such a device unbalances a clear circuit, and is likely to cause trouble from induction due to adjacent circuits of other descriptions.

SOLDERING SOLUTION.—(309.)

My experience in electric-light and power construction has shown me that no soldering flux for copper wire is better than a weak zinc-muriatic acid solution. What is the objection to using this in telephone work? A. L. B.

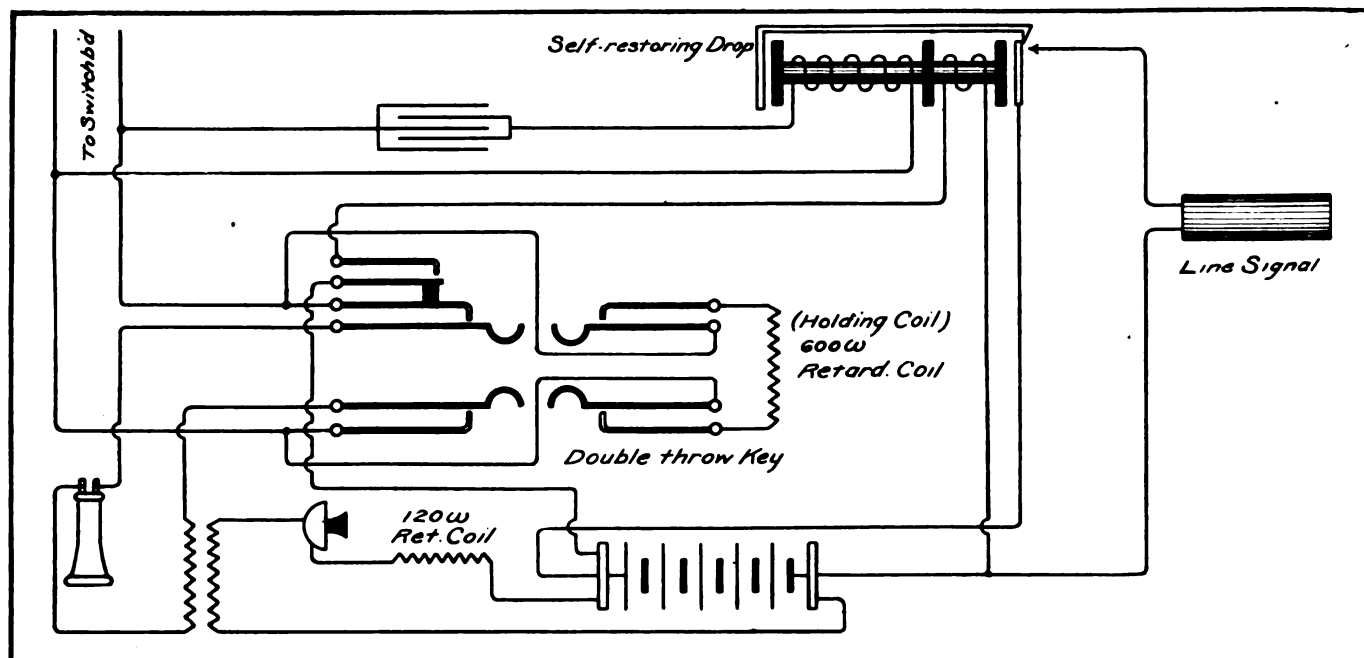


Figure 307.

the switchboard would be displayed and the connection taken down. The means by which this result is avoided is shown in the diagram, Fig. 307.

The lines from the switchboard to the desk, are terminated on double throw keys, so that the operation of a key in one direction, serves to connect the desk operator's set, to the line while the operation in the reverse direction bridges a 600-ohm retardation coil across the line to the switchboard and thus by short-circuiting

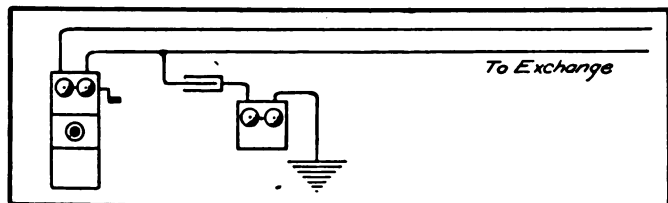


Figure 308.

the line prevents the operation of the supervisory signal and holds the connection until the desk operator is at liberty to take it up again. The diagram (Fig. 307) also shows a common method of wiring such lines.

CONDENSER BETWEEN LINE AND GROUND.—(308.)

Would a condenser connected in series with an 80-ohm bell between one side of a metallic circuit and ground, as shown in Fig. 308, make the line noisy?

H. C. T.

Such arrangements would be likely to give trouble provided there were earth currents in the vicinity of the point where the line was carried to ground through the condensers. Earth currents are almost always varying ones, and, under such circum-

stances, the introduction of condensers does not open the circuit, and innumerable difficulties are likely to creep in in any arrangement of this kind. Such a device unbalances a clear circuit, and is likely to cause trouble from induction due to adjacent circuits of other descriptions.

Acid solution or flux containing chemicals which will conduct the electric current should not be used, as it is impossible to remove all traces of the flux after soldering. The heat from the soldering iron drives the acid into the windings if used on a piece of apparatus containing the same, or into the wires of a cable. The terminals and wires are usually in close proximity and the slightest leakage from one circuit to another will conduct the voice currents, generator currents and leakage to ground, producing cross talk, generator noise and induction disturbances. Resin should be used as it is the only safe flux which has insulating properties and leaves a dry deposit which will not collect dust and dirt. Grease flux will hold all dust and dirt which may in time cause leakage or trouble. Copper wire is made with a thinned coating so as to be easily soldered with resin. Also all terminals of telephone apparatus are tinned by aid of acid flux and carefully washed before assembling. A hot soldering iron with good resin, core solder should make a reliable soldered joint between small tinned parts before any objectionable heat can reach the body of the apparatus. Thus it is not necessary to heat up the terminals of the apparatus to a point sufficient to soften hard rubber insulation.

DUPLEXING PARTY LINES.—(310.)

Are duplexers to be recommended for rural party lines?

B. D.

We understand your query to relate to operating party lines by what is called duplex telephony. We have never heard of this method being applied to party lines as it is too complicated and requires too much care for such service.



THE WEEK'S MESSAGES

FINANCIAL

PARKERSBURG, IA.—The Parkersburg Telephone Company has increased its capital stock by \$1,000. James Gardiner is president of the company; James Shoemaker, vice-president, and Robert Camp, secretary.

TRUMAN, MINN.—The Armstrong Telephone Exchange of this place has increased its capital stock from \$25,000 to \$100,000. W. O. Hoover is president of the company and R. O. Armstrong, secretary.

BUSKIRKS, N. Y.—The Buskirks & South Cambridge Telephone Company has increased its capital stock from \$400 to \$1,600.

HILTON, N. Y.—The Hilton Telephone Company has increased its capital stock from \$3,000 to \$10,000.

NORTH BENTON, O.—The North Benton & Deerfield Telephone Company has increased its capital stock from \$1,000 to \$15,000.

DODGEVILLE, WIS.—The Dodgeville-Union Mills Telephone Company has increased its capital stock from \$1,200 to \$5,000. James Gardener is president; L. M. Beddell, secretary.

DOTMAN, ALA.—The city council has granted a franchise to Henderson & Cameron to construct a telephone line through the streets of the town.

ANAHEIN, CAL.—A franchise has been granted to W. L. Porterfield, representing the Home Telephone Company, for the construction of a local exchange.

DAUPHIN, MANITOBA, CAN.—The franchise for a telephone system has been granted to Messrs. Hodgson & Rolston, of Minneapolis.

HOLYOKE, COLO.—C. H. Harris, of this city, has applied to the city council for a telephone franchise.

LEWISTON, IDAHO.—The city council has granted a franchise to the Nex Perce Co-Operative Telephone Company. P. W. Mitchell is president of the company.

LEMONT, ILL.—The city council has granted a franchise to the Interstate Independent Telephone & Telegraph Company.

OAKLAND CITY, IND.—The city council has granted a 25-year franchise to the Independent Telephone Company, which will install a plant at once.

WORTHINGTON, IND.—The Green County Telephone Company of Worthington has been granted a local franchise.

HARLIN, IA.—The Shelby County Mutual Telephone Company has asked for a local franchise.

REASNOR, IA.—The Reasnor Telephone Company has been granted a franchise at Newton.

ASHLAND, KY.—The city council has advertised a telephone franchise for sale at auction to the highest bidder.

COLDWATER, MINN.—It is understood that at the next meeting of the city council a telephone franchise will be asked for by a new company backed by local capitalists.

FARIBAULT, MINN.—A. G. Chase, supposed to represent the Tri-State Telephone Company, has asked the city council for a local franchise.

GRACEVILLE, MINN.—J. M. Reedy and J. A. Dahlin, directors of the Parnell Co-Operative Telephone Company, have asked the city council for a local franchise.

MERIDIAN, MISS.—Jones & Winter of Chicago have been granted a franchise by the city council to construct an Independent system here.

ALBION, N. Y.—Guy L. Merrill of this place has been granted a franchise to maintain an Independent telephone exchange. He has become the owner of the Citizens' Telephone Line, and will make many changes in the equipment of this line. A local central office will be established to accommodate the Intercean Telephone Companies' trunk line.

JAMAICA, L. I., N. Y.—The corporation council has decided that the franchise held by the recently organized Seaboard Telephone Company is valid. The company holds franchises in many towns on Long Island.

WHEATLAND, N. D.—F. C. Porolison has asked for a local franchise. C. B. Youngman has also asked for a franchise.

DALLAS, TEX.—It is probable that W. H. McGratty will ask the city council for an Independent franchise.

MEAD, WASH.—J. W. Smiley, of this place, and others have asked the county commissioners for a franchise to construct a telephone line from Mead through several townships to eventually connect with Spokane.

WINFIELD, W. VA.—The City Council has granted a franchise to the Galopis, Buffalo and Winfield Telephone Co., to construct and operate a local system.

CHETECK, WIS.—The Dunn Telephone Company has applied for a local franchise.

MUNCIE, IND.—The Delaware & Madison County Telephone Company has purchased the Summitville Telephone Exchange.

POPLAR BLUFF, MO.—J. Kandy Moore has purchased the plant of the Sikeston Telephone Company, which covers Bloomfield, Poplar Bluff, Dexter, and several other towns.

CLIFTON, TENN.—J. J. Montague has purchased the local telephone exchange from T. S. Hughes. All out of town lines are connected with this exchange by way of Perryville and Corinth.

LA CROSSE, WIS.—J. W. Callaway, who is supposed to represent the La Crosse Telephone Company, has purchased the Union Telephone Exchange of Prairie Du Chien for \$7,000.

ELECTIONS

FORT WAYNE, IND.—The National Telephone & Telegraph Company has elected the following officers: Henry C. Paul, president; C. S. Bash, vice-

president; W. L. Moelering, secretary and general manager, and W. A. Bohn, treasurer.

EAST LIBERTY, IA.—The East Liberty Telephone Company has elected the following officers: F. C. Davis, president; C. M. Smith, vice-president; C. H. Ross, secretary.

FARMERSBURG, IA.—The Wagner Telephone Company has elected the following officers: John Shrader, president; Henry Henks, vice-president; A. A. Kishman, secretary; William Kath, treasurer; Wm. Herher, Louis Saurche, Eli Shepperd, directors.

GRANDY CENTER, IA.—The Farmers' Mutual Telephone Company has elected the following officers: C. H. Baldwin, president; H. C. Schwyhart, secretary and J. M. Harris, treasurer.

ALMA, MICH.—The Union Telephone Company has elected the following officers: S. E. Parkill, president; James P. Gibbs, vice-president; J. H. Feldew, secretary; C. S. Ward, treasurer; W. J. Melchers, general manager. The business of the company has more than doubled the past two years. It is now operating 1,700 miles of toll line and has over 4,000 subscribers.

KILBIE, MICH.—The Kilbie Telephone Company has elected S. M. Trowbridge, president; Robert Adkins, vice-president; J. H. Trip, secretary and treasurer. The company declared the usual 8 per cent. dividend.

KERKHOVEN, MINN.—The annual meeting of the Mamre and Pillsbury Telephone Company was held here recently. The following officers were elected: Alfred Hohngren, president; J. W. Johnson, vice-president; P. S. Ekberg, secretary; H. C. Odnay, treasurer.

DUNBARTON, N. H.—The Dunbarton Telephone Company has elected Edward P. Page, president; James E. Stone, vice-president; F. L. Ireland, secretary; Henry S. Whipple, treasurer; John Bunton, manager.

NORTH COHOCTON, N. Y.—The Steuben-Ontario Telephone Company has elected the following officers: H. W. Blake, of Naples, president; Wm. H. Housel, treasurer; Wesley W. Holcomb, secretary. Some additions will be made this spring.

SANBORN, N. Y.—The Sanborn & Shancee Independent Telephone Company has elected the following officers: S. A. Crosby, president; Walter Baer, secretary and treasurer; Ed. Crosby, superintendent.

ADAMSVILLE, OHIO.—The Adamsville Telephone Company has elected the following officers: J. B. Rhodes, president; C. H. Hanks, vice-president; F. P. Winn, secretary and manager; W. F. Tomlinson, treasurer.

WOODSFIELD, OHIO.—The annual meeting of The Woodsfield Telephone Company was held at Woodsfield on March 21st. The following directors were elected: J. B. Rhodes, W. E. Mallory, P. E. Fraley, L. E. Stegner and F. C. Huth. J. B. Rhodes was chosen president; W. E. Mallory, vice-president; P. E. Fraley, secretary and treasurer; F. C. Huth, general manager. The capital stock will be increased from \$15,000 to \$25,000, and a number of extensions and improvements made the coming summer.

MIDDLEBROOK, VA.—The Middlebrook Telephone Company has elected the following directors: J. H. Bowman, Richard Hoghead, W. B. Giora, C. R. Caldwell, W. C. Bossermann, J. E. Cae, T. M. Smiley and J. Frank Clemer.

PERSONAL

S. R. ROBINSON, formerly of the Pittsburgh and Allegheny Telephone Company of Pittsburgh, in its construction department, has gone with Heeling & Ridge Company, builders of telephone and other electric lines and conduit constructors. The company's address is South 21st and Sidney streets, Pittsburgh.

J. W. HARPER has been placed in charge of the traffic department of the Georgia Telephone and Telegraph Company Savannah, Ga. Mr. Harper has been connected with the collection department of the company since the business was started.

E. W. ABBOTT will after April 1st go to the New Haven office of his company. He has been manager at Norwich, Conn.

E. F. L. BENSON, who has been wire chief of the D. & A. Telephone system at Pottsville, Pa., has gone to West Chester, Pa., to occupy a similar position. James Thompson, of Philadelphia, will take his place.

C. W. BENJAMIN, formerly of New Haven, Conn., but until recently of Waterbury Conn., after April 1st will assume the managership of the Norwich, Conn., telephone exchange.

F. H. BETHEL, who has been contract clerk for the New York Telephone Company, has been chosen for the position of General Manager of the Chesapeake & Potomac Telephone Company, and will assume his responsibilities April 1st.

J. E. CARR, has resigned as manager of the Beloit Telephone Company of Beloit, Ill. His plans for the future are still indefinite.

CHARLES H. HOOD, who has been for some time with the Northeastern Telephone Company, of Portland, Me., will leave for Cleveland, Ohio, where he has accepted a position with the telephone company in that city.

MR. CHARLES MONK, late manager of the Pontiac, Ill., exchange of the Central Union Telephone Company, has moved to Fairbury, Ill., where he has charge of an Independent telephone exchange.

MISCELLANEOUS

HARTFORD, CONN.—The Gray Telephone Pay Station Company has instituted proceedings in the United States circuit court against the Southern New England Telephone Company, of Connecticut, and the Baird Manufacturing Company, of Chicago, for alleged infringement of patents relating to signal devices that are used in pay stations.

LAKE CITY, MINN.—The city council has passed a resolution to place

before voters the proposition of municipal ownership and operation of telephone system in this city.

ERIE, PA.—The Union Telephone & Telegraph Company of Erie is now supplying service to the towns of Union City, Corry, Kane, Mt. Jewett, Smithport, Pa., Olean, N. Y.; Bradford, Girard, Greenville, Mercer, Sharon, South Sharon, Sharpsville, Jamestown, Grove City, Sandy Lake, New Castle

and Ellwood City, Pa. The company has a capital stock of \$227,500, and has issued \$230,000 for bonds. It commenced service in July, 1899, and now has 3,500 subscribers in its territory. Its rates are graded from \$12 to \$30 per annum. The officers of the company are W. B. Trask, president; James McBrier, vice-president; L. M. Little, secretary; James Russell, treasurer, and W. H. Wilson, manager.



New Construction in the Field



ALLEN'S GROVE, ILL.—A new telephone line is being put in at Allen's Grove by the Allen's Grove Telephone Company.

LAFALETTE, ILL.—The Lafayette and Center Prairie Telephone Company has elected Hymen De Wolf, president; Harry Bradley, vice-president, and Fred. Atherton, secretary and treasurer.

MAYVIEW, ILL.—Farmers northwest of here are preparing to erect a telephone line to connect with the Home Telephone Company in Urbana.

TRIVOLI, ILL.—The Trivoli Central Telephone Company will construct a new exchange, to which several farmers' lines entering this town will be connected.

GASTON, IND.—The Gaston Telephone Company is making several extensions to its lines. A new line is being organized from Zion Church and one to Wheeling to connect with the local exchange.

LOGANSPOUT, IND.—The Logansport Home Telephone Company is arranging to enlarge the capacity of its switchboard to accommodate 2,000 telephones. An exchange will also be installed at Young America.

PRINCETON, IND.—The Independent Telephone Company of this city will install an exchange at Hazleton.

RUSHVILLE, IND.—The Co-Operative Telephone Company is planning to increase its plant.

RUSHVILLE, IND.—The Rushville Telephone Company held a meeting to devise plans to raise additional capital for necessary improvements. L. C. Lambert, a local real estate man, offered to buy the plant and spend \$100,000 for repairs and improvements in the next 10 years. The majority of the stockholders favor an increase of the capital stock. About \$32,000 is needed for immediate improvements.

SOUTH BEND, IND.—The Home Telephone Company is preparing to extend lines to Miles, Galion, Buchanan and other towns.

SOUTH BEND, IND.—The South Bend Home Telephone Company has decided to install an exchange at River Park.

SUMMITVILLE, IND.—A number of farmers living east and southeast of town have organized a Co-Operative Telephone Company to build a line connecting with the local system.

MALVERN, IA.—The City Telephone Company will construct a line out of Emerson and install an exchange at Pacific junction.

OCHEYDAN, IA.—Farmers north of town are considering the question of building a telephone line to connect with the local exchange.

WEBSTER CITY, IOWA.—The Martin Telephone Company is making preparation for a great deal of extension work this summer; 10,000 feet of new underground cable will be laid, the aim of the company being to make all circuits metallic.

CONWAY SPRINGS, KANSAS.—The Home Telephone & Electric Company of Conway Springs will build 70 miles of toll line, extending its lines to Wichita and Harper.

ELK CITY, KANS.—The Home Telephone Company will construct a line at once from here to Longton.

TESCOTT, KANS.—The Tescott Telephone Company has secured a franchise for a telephone system and will begin construction at once.

HAWESVILLE, KY.—C. W. Meserve will construct a telephone line from Hawesville to Pellville by way of Chambers.

BOLTON, MASS.—At a meeting held here it was unanimously decided to form an independent telephone company. Rev. J. N. Pardee, Louis E. Day, George E. Dow, Dr. O. A. Everett, and William N. Felton will act as a committee to report cost of wire instruments, etc.

APPLETON, MINN.—A. Williams, Superintendent of Construction for the Minnesota Central Telephone Company, says that his company will probably install a common battery system, requiring new telephones, cables and switchboard.

BEAVER CREEK, MINN.—E. J. Dunber, M. C. Page, H. J. Ferguson and others are planning the construction of a local rural telephone system.

BERTHA, MINN.—The Hewitt and Wrightstown Telephone Company will construct a line from Bertha to Long Prairie.

BROOTEN, MINN.—The Brooten-Senburgh Telephone line will be built this spring. John Bohmer and Dr. Leach are among the heaviest subscribers.

COWELL, MINN.—A telephone line is proposed from here to Artichoke.

HAUSKA, MINN.—A telephone company has been organized to build a local exchange and lines in the country.

RED WING, MINN.—D. M. Mill and associates are planning the organization of the company to construct a local telephone system.

ROTHSAY, MINN.—The Commercial Club will organize a local stock company to construct a local telephone exchange.

THIEF RIVER FALLS, MINN.—A new telephone line from here to Greenbush will be constructed this spring.

WINNEBAGO CITY, MINN.—F. C. Blowers of Winnebago, representing the Blue Earth Valley Telephone Company is arranging for the construction of several rural lines.

VALENTINE, NEB.—C. S. Reece is organizing a company to construct a telephone line from Valentine to Kennedy.

WAKEFIELD, NEB.—M. H. Spere is installing exchanges at Wakefield, Emerson and Pender. He will operate about 1,000 telephones from the three exchanges and several farmer lines.

CANANDAIGUA, N. Y.—The city council has asked for bids for reconstruction of the fire alarm system. It is probable that the contract will be given to the Interlake Telephone Company.

CENTER LISLE, N. Y.—A company has been organized here and has purchased the line of Dr. Teed and Merton Sternburg from Lisle to Center Lisle. Teed and Sternburg will construct another line to Center Lisle, and probably to Berkshire.

COOFERSTOWN, N. Y.—The Independent Telephone Company will construct a line from here to Cobleskill and Albany.

CLYDE, N. Y.—The Wayne Telephone Company has closed a contract with 20 farmers to construct a line from Clyde to Waterloo.

JACKSONVILLE, N. Y.—A meeting for the purpose of organizing a local telephone company was held by prominent men of this place and vicinity recently.

SCIO, N. Y.—Residents of this place are planning the organization of a local telephone company to give farmers service.

KINDRED, N. D.—The Kindred Telephone Company will extend its service this spring. A line will be constructed to Norman and one to Warren. A line will also be constructed from Barry to Kindred.

MOORE, N. D.—The citizens of this place intend to erect a telephone line to Enderlin.

BELLEFONTAINE, OHIO.—The United Telephone Company has been granted franchises in Zanesfield and Huntsville, and will install exchanges in each village at once. Toll stations will be put in at Harper and Pickersilltown.

BOWLING GREEN, OHIO.—The Wood County Telephone Company is preparing to make repairs and extensions on its lines this spring. A new line will be built to Portage and one to Sugar Ridge.

COLUMBIANA, OHIO.—The Fairfield Township Telephone Company, by its manager, J. W. Weaver, has advertised for bids for the construction and equipment of about 15 miles of lines southeast of Columbiana.

GENEVA, OHIO.—An effort is being made by outside persons to revise local capital and organize a new telephone company in this locality.

NEWARK, OHIO.—At a meeting of the directors of the Newark Independent Telephone Company Manager C. F. Hollander was instructed to proceed with the construction of the farmers' lines leading from Newark. The company declared its regular quarterly dividend on common stock.

JET, OKLA.—The Jet Rural Telephone Company will extend its lines to 60 more farmers this spring.

MEDFORD, OKLA.—The Pyle Telephone Company of Medford and Pond Creek has orders for over 150 farmers' telephones, and new lines will be constructed this spring.

TOKAWA, OKLA.—The Farmers' Rural Telephone Company of Tonkawa will rebuild its system, installing a new switchboard of 200 lines capacity.

HENCHWOOD, PA.—J. W. Stewart, Charles Matthews and H. C. O'Hara, representing the Beechwood Telephone Company, were in Falls Creek recently securing subscribers. If a sufficient number is obtained the company will construct a line to that place.

CRESSON, PA.—John Pfeister, manager of the Cambria County Telephone and Telegraph Company is making arrangements to construct a telephone exchange in Lilley.

MORGANTOWN, PA.—The Conestoga Telephone Company has decided to rebuild its line from this place to Jonanna, and also the line from Willowglen to this place.

PHOENIXVILLE, PA.—At a meeting held here citizens were in favor of constructing a local telephone system. A similar meeting was held at Coatesville.

FARNSWORTH, S. DAK.—Farmers living near this place will construct a telephone line to Carthage.

LADELLE, S. DAK.—Farmers of this vicinity have made arrangements for the construction of a telephone line to Doland.

RICHLAND, S. DAK.—E. F. Cobb is interesting farmers in a rural telephone line for Union Creek.

LEWISBURG, TENN.—B. F. Coleman and J. K. Jobe were here recently securing subscribers to the Lewisburg and Yell Telephone Line.

BLUM, TEX.—Dr. W. E. Maner and others will construct a local telephone exchange.

CHARLESTOWN, W. VA.—A. G. Wyckoop has organized a Jefferson County Local Telephone Company for the purpose of furnishing service to farmers at cost.

SYRACUSE, NEW YORK, CONDITIONS.

COMPETITION between the Independents and the Bell concern in Syracuse is keen. The Bell Company has cut out its limited service and is giving a flat rate for residence telephones at \$24 per year. The company has also put an extra number of solicitors at work to get back the business which the Independent company took away. The central building of the Bell Company is to be enlarged and other improvements are to be made.

Because of the large volume of business done by the Independents, they also will make extensive improvements. The principal one is the addition of sections to the switchboard. The manager of the Independent company, F. M. Potter, said that there would be some important announcements soon to be made, but he declined to go into detail as to the nature of the improvements contemplated.

BOOK NOTICES

Any book herein reviewed will be sent post paid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

THE GAS ENGINE. By Fred. R. Hutton, Professor of Mechanical Engineering in Columbia University. New York: John Wiley & Sons, 1903. 483 pages, 243 illustrations, Price, \$5.00.

This latest contribution to the literature of gas engines is a treatise by Professor Hutton, who is too well known to the mechanical engineering profession to need the slightest introduction. In this volume Professor Hutton takes up the gas engine from the engineering standpoint entirely, and not from that of the operator. The first 128 pages of the volume are devoted to a description of the theory of the internal-combustion engine, which is dealt with as simply as the somewhat complicated mathematics of this subject will permit. The next 136 pages are devoted to a description of the salient types of gas, gasoline and alcohol engines. In this portion of the volume few mathematics exist, and this portion, for the lay reader, at least, is more attractive. Then comes a chapter on the problems of gas engines by test, which is succeeded by a theoretical analysis that, however interesting and profitable to the student of engineering, will be found to be rather beyond the range of the average telephonist, who is chiefly interested in gas engines. As a valuable prime mover for charging storage batteries the last two chapters deal with testing the explosive mixtures, including a lot of very valuable data for those whose business it is to design gas engines. To the library of the manufacturer and the engineer this volume will be a welcome addition as well as to the student of thermodynamics, and while the practical man will find in it many useful suggestions and will learn therefrom much that is valuable in the design and construction of gas engines, it is hardly a volume which will appeal strongly to the operator.

TRADE NOTES

THE W. G. NAGEL ELECTRIC COMPANY, of 520 Adams St., Toledo, O., is now distributing its new 904 page catalogue, which is one of the most complete which has been issued up to the present time.

THE ELECTRIC APPLIANCE COMPANY, Chicago, will send information upon request relating to its new No. 36 X-P type telephone. The company calls it its "Extra Powerful" and claim that it is worth hearing about.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of 336 to 342 Ellicott Square, Buffalo, N. Y., has recently completed a magneto exchange for the Corfu Home Telephone Company, Corfu, N. Y. This exchange is now in operation and gives service to something over fifty well satisfied subscribers. The equipment is a signal bell board of thirty lines capacity.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY announces that the Bowling Green Telephone Company, Bowling Green, Mo., has recently completely re-equipped its central office apparatus and enlarged the exchange to meet the rapidly increasing demand. It installed a 400-line "International" self-restoring drop switchboard and "International" telephones for the increase in the plant.

THE GEMMILL TELEPHONE & MANUFACTURING COMPANY, of Cleveland, O., is placing on the market a new telephone ringer, for the adjustment of which no tools are necessary. Knurled thumb screws are provided, by means of which the magnet cores may be moved to and from the armature. The armature itself is shaped peculiarly, which is said by the makers to increase the good qualities of the ringer.

JONES AND WINTER, the telephone engineers and contractors, 1259 Monadnock Building, Chicago, have just installed a telephone plant at Gainesville, Texas. The equipment is of the Sterling make, and full central energy. The switchboard now accommodates 750 subscribers and has an ultimate capacity of 2,200 lines. Mr. C. B. Luck was superintendent of the company at this installation and Mr. J. R. Deever was foreman.

THE LEWIS LUMBER & MANUFACTURING COMPANY, of Hattiesburg, Miss., R. R. Akers, manager, manufactures long leaf yellow pine cross arms, locust pins, oak pins and brackets. It says that spring trade has opened up very brisk, it having already booked orders this month amounting to 100 carloads. It is prepared to take care of a large amount of orders, as its capacity is now 500,000 feet per month. It makes a specialty of All Heart and odd-sized arms for special work, and is getting a great many of these orders.

THE STERLING ELECTRIC COMPANY, of La Fayette, Ind., and 1260 Monadnock Bldg., Chicago, Ill., has just completed at the exchange of the Home Telephone Company, of Toledo, O., the largest single extension that has

ever been built to a telephone switchboard in America. The addition gives an additional capacity of 1,000 lines to the exchange, making the equipment capable of handling 7,000 lines. The cost of the extension was \$29,000, making a total expenditure of \$148,000 for the Home Telephone Company's board.

THE HOLTZER-CABOT ELECTRIC COMPANY, of Brookline, Mass., has just issued a bulletin of some 20 pages, containing the same number of illustrations, giving complete descriptions of the various intercommunicating systems which this company manufactures. The illustrations are chiefly wiring diagrams which show the way in which the speaking tube and other similar systems should be installed. The various systems are described and the amount of labor and material indicated, which are required for their installation. The company will be pleased to send a copy of the booklet to any one interested.

THE INDIANAPOLIS ARM, PIN & BRACKET COMPANY, of 125 South Meridian street, Indianapolis, Indiana, with its factory at Madison, Indiana, has been taken charge of by a receiver. Mr. Ben T. Head, cashier of the People's Bank, was the receiver appointed. The plant is in a good condition, but owing to the failure of one of its managers, debtors closed in on the concern. The concern is really solvent. The capital stock is \$20,000 and the visible assets are between \$10,000 and \$15,000. The liabilities are only about \$5,200. The plant will go ahead under Receiver Head's management at once. The company will be reorganized under Mr. A. F. Potts, a capitalist of Indianapolis.

THE STANDARD TELEPHONE & ELECTRIC COMPANY, of Madison, Wisconsin, intends to move to Milwaukee some time between the 1st and the 15th of April, and will take quarters in the Johnson Service Building, which is equipped with power for manufacturing purposes. The company reports that its business has so increased in the past two years that the present change to larger quarters and better facilities is imperative. The company has recently added another department to its business, that of manufacturing perfect die molded castings of small parts that can be used by telephone manufacturers as well as the general trade. The officers of the company are Thos. H. Gill, president; E. A. Wadhams, vice-president; J. H. Parish, secretary and general manager.

THE STANDARD UNDERGROUND CABLE COMPANY, of the Westinghouse Building, Pittsburg, Pa., announces the recent opening of a branch office or headquarters in the Security Bldg., St. Louis, Mo., in charge of Mr. W. A. Caldwell, who was formerly connected with the Chicago office of the company, but more recently with the home office at Pittsburg. Mr. Caldwell had a number of years' experience with the company in both the construction and sales departments. This company has now seven district or branch offices throughout the country, covering the whole of it from Maine to California, namely: The Northeastern Sales Dept., Delta Bldg., Boston, Mass.; The Eastern Sales Dept., 56 Liberty St., New York City, N. Y.; The Southeastern Sales Dept., Betz Building, Philadelphia, Pa.; The Central Sales Dept., Westinghouse Bldg., Pittsburgh, Pa.; The Western Sales Dept., The Rookery Bldg., Chicago, Ill.; The Southwestern Sales Dept., Security Bldg., St. Louis, Mo.; and the Pacific Coast Sales Dept., Crossley Bldg., San Francisco, Cal.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. **AMERICAN TELEPHONE JOURNAL** knows we are O. K. Send for samples. **GILDART BROTHERS**, Albion, Mich. 131

WANTED—Position as manager or assistant of telephone exchange of 200 or more subscribers. Over five years' experience in switchboard and construction work. Must be permanent. Address Box No. 86, Wellsburg, W. Va. 149

POSITION—Competent telephone man desires position. Seven years' experience in both inside and outside work. Thoroughly understands Common Battery and Magneto Systems. Best of references. Address Box 154, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 154

POSITION—Wanted as wire chief or switchboard man. Nine years' experience. Good references. Address Box 158, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 158

WANTED—Position by a man with eight years' experience on subway work, either as superintendent or general foreman. Excellent references. Address Box 159, care of **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 159

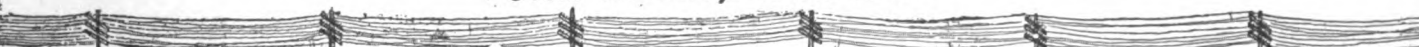
EQUAL PRICES ON POLES

don't always mean equal service. The other man may not ship your poles when you want them. They may not be quite up to standard in every particular. Buy of us and save worrying about any such contingency. "When it's wrong, we make it right." Get our prices. Write today, now.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.


"From the Stump to the Line"



PITTSBURG & LAKE SUPERIOR IRON CO ESCANABA MICHIGAN

PRODUCERS AND WHOLESALEERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

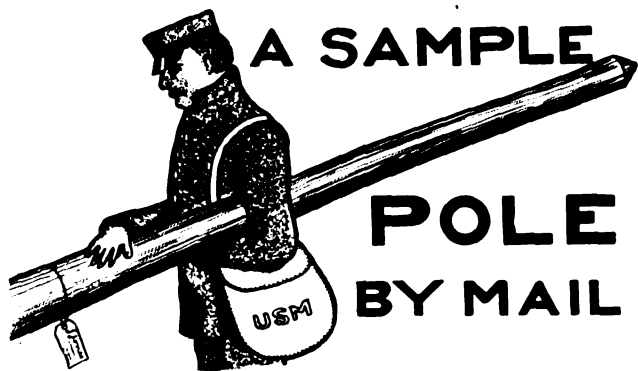
Suite 1206, Tribune Building,

CHICAGO, ILL.

Juniper Poles

The Standard Pole & Tie Co.

550 Venezuela Building, New York



A SAMPLE

POLE
BY MAIL

is hardly possible, we admit.
But why not try a

SAMPLE CARLOAD
of our

POLES
BY RAIL

Our Prices are attractive and we can make prompt shipments.

SAND POINT CEDAR CO.
SAND POINT, IDAHO.

The **Valentine-Clark Co.**

*Begin to announce to
users of . . .*

**CEDAR
POLES**

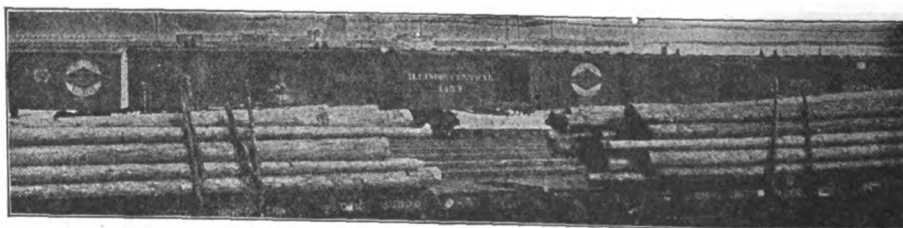
that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

*234 La Salle Street,
Chicago, Ill.*

Cedar Poles

Large Stock
Prompt Ship-
ment.



**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

ELMORE-FOWLER-JACOBS CO.

FOWLER-JACOBS CO.

Idaho Cedar Poles

PACIFIC COAST POLE CO.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press
of the World

MONTHLY. \$2.50

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

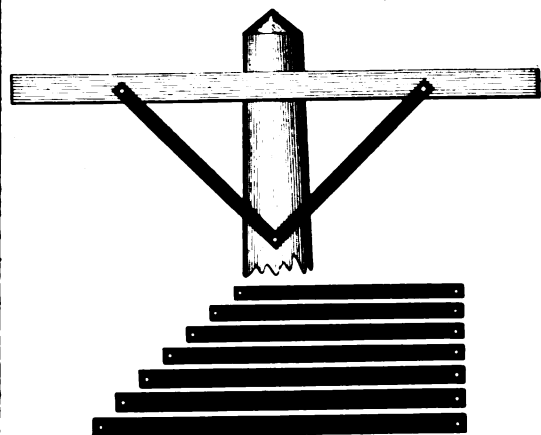
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Menadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN JAPANNED GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

INDIAN

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

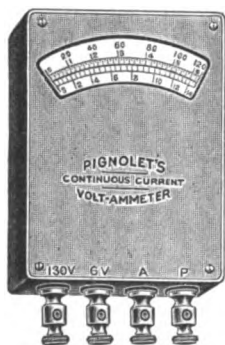
MICHIGAN

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices
Prompt Dispatch
Good Quality...

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. CHURCHILL

HERON, MONT.

YARDS { HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK



Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Salesman

costs you lots of money. He covers a limited territory only.

An Ad

doesn't cost much, and covers the whole territory. Write for prices.

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you.
Orders filled at once; no delays, no "cussing." TRANSPORTATION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

We Make
a Specialty
of
Telephone
Poles.

Large Stock

16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

FRANCIS
BEIDLER
& CO.
459-519 W. 22d St.
CHICAGO, ILL.

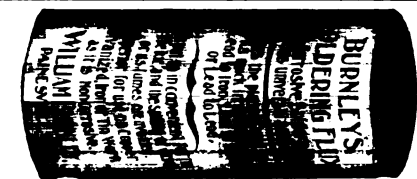
Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♡ ♡ ♡

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO




Do you always mention the

American Telephone Journal

when writing to advertisers?
It will be appreciated by all
concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.
R. R. AKERS, Manager.
LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR** :: ::
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

W. H. CRUMB & COMPANY

Engineers
Contractors

TELEPHONE ENGINEERING AND CONSTRUCTION

*Plans, Specifications
and Estimates Promptly
Furnished. :: ::
Meritorious Independent
Telephone Enterprises
Financed. :: ::*

**1263 MONADNOCK BLDG.,
CHICAGO, ILLINOIS**

The James A. Spargo Wire Co.

Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

Chicago Insulated Wire Co.

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL. \$250,000.00.
Main Offices, 551-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

Keeling & Ridge Co.

General Contractors
Builders of Telephone and Telegraph Lines, Electric Railroad, Power Lines, etc. Conduit Work a Specialty.
Twenty-first and Sidney Streets,
PITTSBURGH, PA.

MARLIN CABLE HANGERS

Have you seen our No. 3 Grade? Write for samples.
National Telephone Supply Co., CLEVELAND, OHIO.

WESTON STANDARD PORTABLE DIRECT READING


Voltmeters, Ammeters, Millivoltmeters, Voltmeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument Co., Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS—FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



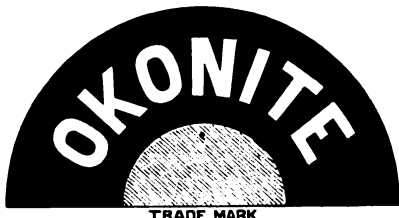
Weston Standard Portable Direct Reading Voltmeter.



**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.
We make Linemen's Tools our Specialty.
MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

COOK PROTECTORS STANDARD



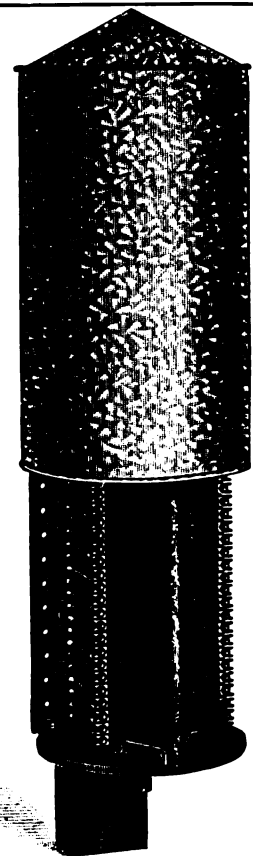
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

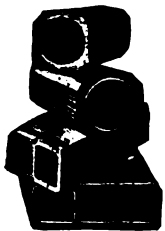
STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.
39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

An Ad

in a weekly paper reminds the purchaser fifty-
two times a year; in a monthly paper, but
twelve times.

16 to 1

is a dead issue, but

52 to 12

is not. It is our issue.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

**NEW YORK LIFE BUILDING,
KANSAS CITY, MO.**

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat
lighter and more convenient to handle than Steam Pipe, and at much
less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen
feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and
Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

BITUMINIZED FIBER CONDUIT

For Electrical Underground Construction

ELECTROLYSIS PROOF WATER PROOF

(Copy.)

GENERAL ELECTRIC COMPANY,
SAN FRANCISCO OFFICE,
CROSSLEY BUILDING,
March 19, 1904.

MR. GEORGE H. BARKER,
Vice-President American Conduit Co.,
170 Broadway,
New York, N. Y.

Dear Sir:—

We have used the Bituminized Fiber Conduit for ducts in many high potential stations and consider it an ideal conduit for high potential work.

The conduit can be made absolutely water proof, and is easy to handle, and possesses in itself an extremely high insulation.

We have recommended it to all our customers for this class of work.

Yours very truly,
(Signed) J. A. LIGHTHIPE.
Engr. San Francisco Office.

A smooth laminated insulator of unchanging durability.

Forms a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate.

There has never been a gas explosion in our conduits nor the slightest evidence of electrolysis.

Abrasion of the cables is an impossibility.

It saves sixty per centum of freight and handling cost, and twenty to thirty-five per centum of construction.

Process of laying is simple, rapid and inexpensive. There is no loss from breakage or fitting. It is self-aligning and cannot settle out of alignment.

All sizes from one inch to ten inches interior diameter. Bends of all angles.

The foremost electrical engineers are recognizing and testifying to the scientific advantages of our system of subway construction over all previous methods.

Factories: PHILADELPHIA, CHICAGO, LOS ANGELES.

PROMPT DELIVERIES.

Send for Illustrated Book. Ask for Prices, Giving Size and Quantities Required.

Seventh Floor,
170 BROADWAY

AMERICAN CONDUIT COMPANY

NEW YORK

336 Macy St., LOS ANGELES, CAL.

Rushman Building, CHICAGO.

ADVERTISERS' DIRECTORY—Concluded

POWER PLANTS.

Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.

Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
Shaw-Walker Company, Muskegon, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BOOTHS.

Yeshera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.

Leslie, A. C., & Co., Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yeshera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburgh, Pa.



**Experience
is a wise teacher**

**We were taught in
that school.**

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

4



4

Leich High and Low Frequency FOUR-PARTY SELECTIVE SYSTEM

The only system that merits serious consideration at the present time.
No springs to adjust. Non-harmonic. No relays. Condensers in
circuit to stop battery loss.



WRITE FOR OUR SELECTIVE BULLETIN B6

AMERICAN ELECTRIC TELEPHONE COMPANY

4


36-58 W. JACKSON BLVD.




CHICAGO, ILL.

4

THE AMERICAN TELEPHONE JOURNAL



The President of the Bell



licensee company, operating at Evansville, Ind., Mr. James E. Caldwell, has sent to the Editor of THE AMERICAN TELEPHONE JOURNAL a letter which is the strongest endorsement ever given a class paper.

The letter was called forth by the article on the Evansville situation, which appeared several weeks ago in the JOURNAL.

Mr. Caldwell, speaking of the statement that his company had paid \$11,500 in one month to the newspapers of Evansville to pervert popular opinion against the Independent company, says:

"I shall not undertake to deny or question your position with regard to them."

It is presumed he means by this statement that our article in this respect was correct. Mr. Caldwell then continues:

"Clearly your publication is brought into existence and fostered solely in the interests of the so-called Independent telephone movement."

The Editor wishes to thank Mr. Caldwell for his unequivocal endorsement of the JOURNAL as an Independent publication.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—APRIL 9, 1904—CHICAGO Number 15

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

A UNIQUE CORDLESS SWITCHBOARD.....	By P. Kerr Higgins
SOME NOVEL RECEIVER INVESTIGATIONS.....	By J. W. Lattig and Charles L. Goodrum
TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION. Installment V.....	By Frank F. Fowle
IMPEDANCE AND RETARDATION. Article IV.....	By Arthur Vaughan Abbott
CONSTRUCTION OF A CIRCUIT CLOSER.....	By C. S. Bundesman
A FORTY DOLLAR TELEPHONE CONVERSATION.....	TELEPHONE CONNECTION NOTIFICATION

The Operating Field:

MR. LATTIG RESIGNS AND IS GIVEN GIFT.....	METHOD OF CLEARING SHORT CIRCUITED CONDENSERS
IOWA INDEPENDENT TOLL LINE MAP.....	LEGAL VICTORY FOR CINCINNATI INDEPENDENT COMPANIES
EXECUTIVE COMMITTEE MEETING OF MUNICIPAL ELECTRICIANS.....	TRAFFIC COMMITTEE MEETING
DRUGGISTS AND PHYSICIANS DISCONNECT BELL TELEPHONES IN KANSAS CITY.....	BILL INTRODUCED IN NEW YORK TO COMPEL INTERCHANGE OF SERVICE
QUERIES.....	THE EDITOR'S PAGE.
THE WEEK'S MESSAGES.....	TRADE NOTES.
WANT AND FOR SALE ADVERTISEMENTS, PAGE 240.	PATENTS.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves,
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

(Signed) CEDAR RAPIDS & MARION TELEPHONE CO.,
W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

**New Haven
Novelty Machine Co.,**
ELM AND STATE STS.,
NEW HAVEN, CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK**

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

EXTRA POWERFUL

There is always something new under the sun.
Now it is our No. 36 X-P Type Telephone.

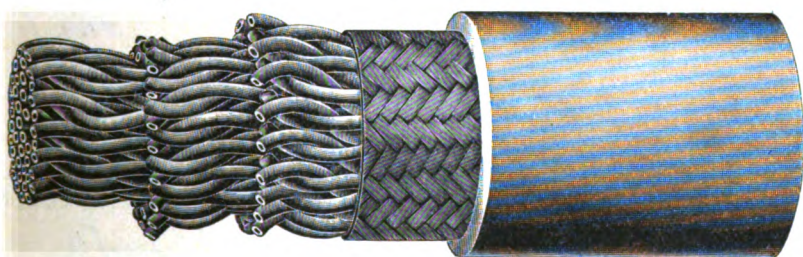
It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

We will tell you more about it if you ask.

ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET - - - - CHICAGO



Manufacturers of

"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

*Write for
Sample Card of Wires*

Indiana Rubber and Insulated Wire Co., JONESBORO, IND.

SUBSCRIPTION BLANK

Cut this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

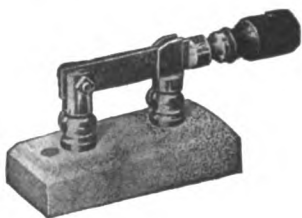
Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....



THE OLD WAY and THE NEW WAY



The old way of transmitting messages was as reliable as the old way of connecting a few rural telephone lines by means of knife switches.



Our modern method for accomplishing this result is as much in advance of the old method as the new way of transmitting speech is over the old.

WRITE FOR DESCRIPTIVE BOOKLET 30-B

STROMBERG-CARLSON TELEPHONE MANUFACTURING CO.

General and Eastern Sales Office:
ROCHESTER, N. Y.

Sales Department:
CHICAGO, ILL.





SPRING IS HERE



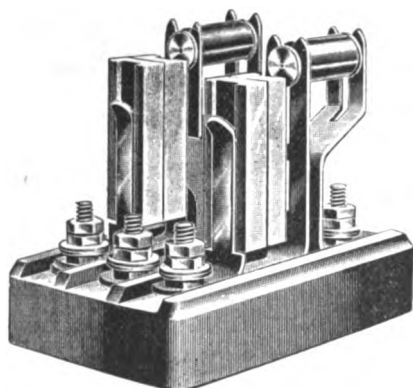
WITH ITS

STORMS

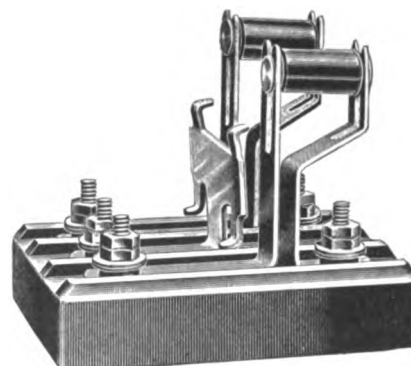
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 251 A.



Something New in a Protector for Telephones.
Order No. 251 B.

WRITE FOR PRICES.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



The
CENTURY

COMMON
BATTERY

SWITCHBOARD

ADAPTABLE TO

Magneto Systems

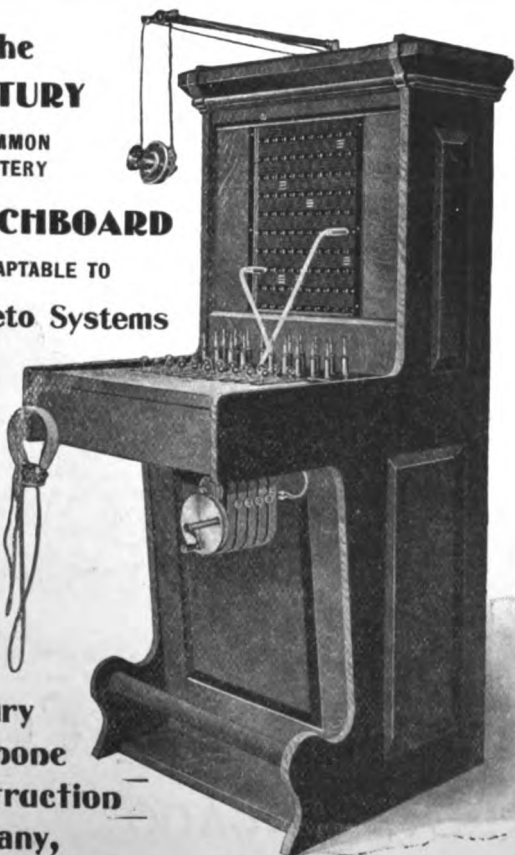
Simple
Durable
Efficient

WRITE
TODAY

Let Us
Tell You
About
It.

Century
Telephone
Construction
Company,

536 Ellicott Sq., BUFFALO, N. Y.



IT'S OUR BUSINESS
to convince you that in our new type
EXPRESS BOARD

*We have reached
the acme of*

**Electrical and
Mechanical
Perfection**

*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

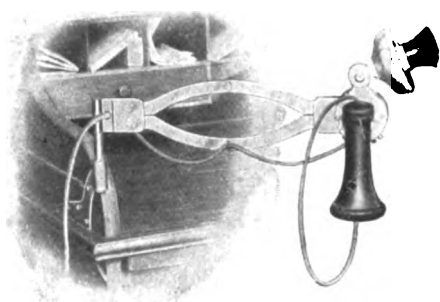
INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



SHORT TALKS ON

THE ADJUSTAPHONE

No. 2—The Extension Arms



Next in importance to the Switch-hook is the purely mechanical portion of the instrument—the set of toggle-arms or levers.

The Levers Won't Wear Out

These levers are punched from the best grade of sheet steel, and are then properly hardened.

The principle is that of the "lazy-tongs," with the arms geared together to produce a parallel motion.

These Arms Form Absolutely No Portion of the Electrical Circuit

All exposed parts of the ADJUSTAPHONE are finely polished, and nickel-plated on copper, producing a finish at once handsome and durable.

All connections are made through cords leading from the switch-hook box. These cords are looped through eyelets fastened to the arms, to prevent their being jerked from their connections.

But we can show you all these points in a much more convincing way—just send for some ADJUSTAPHONES which will be sent on FREE TRIAL—equipped AS YOU PLEASE, with ANY TRANSMITTER and RECEIVER, for use with ANY SYSTEM.

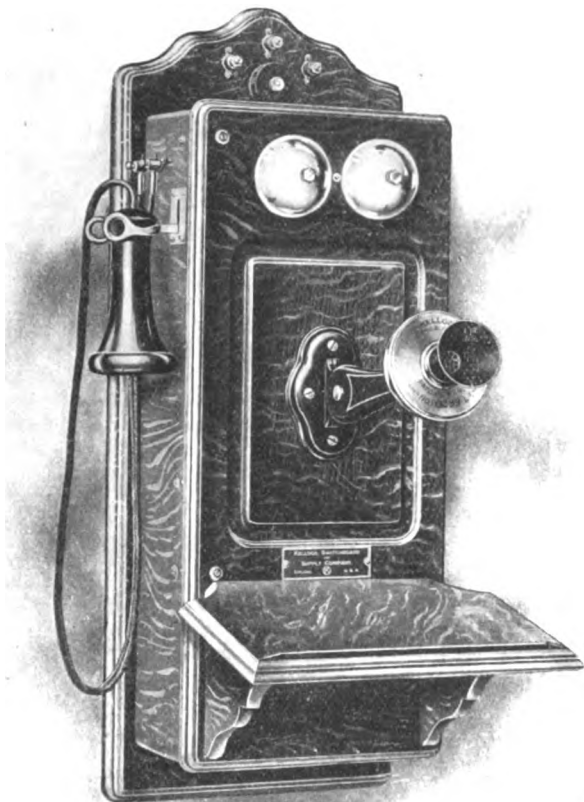


TELEPHONE DEPARTMENT

CHICAGO WRITING MACHINE CO.

101 WENDELL STREET, CHICAGO

Kellogg Magneto Telephones



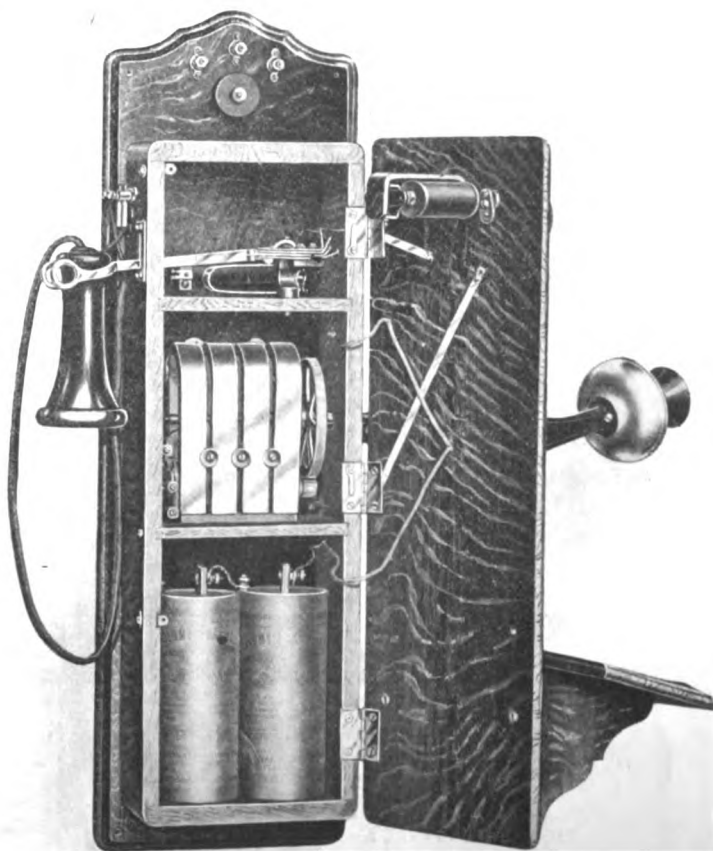
ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

*They are remarkably
durable, compact and
of handsome design.*

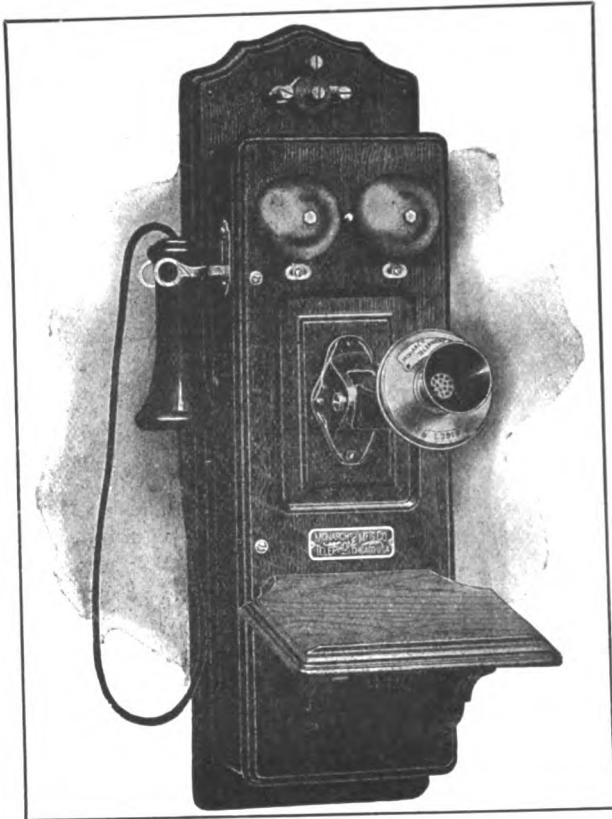
*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**

GREEN AND CONGRESS STS., CHICAGO



Electric Building Cleveland
Keystone Telephone Building, Philadelphia



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

Practically Unlimited! IN ITS SCOPE.

That's a strong statement to make, under any circumstances—but one that is usually *relative*.

Abruptly Ask a Man

how wide the full moon looks to him and he is apt to say from "six inches" up to "half a mile." Try it. Out of ten men no two will have the same idea of distance—because each unconsciously uses a different standard of measurement.

Thus, when we say the scope of

The Pendent Telephone

is practically unlimited, we mean as compared with all other phones or adjustments thereof.

No other telephone may be moved down, up or laterally without effort, and used in any attitude, at any height, angle or distance, at will.

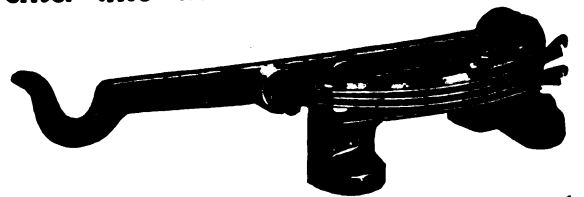
It is, besides, efficient, durable elegant and inexpensive.

The VOUGHT-BERGER CO.,

MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS, AND APPLIANCES,
La Crosse, Wis.

The reason COUCH TELEPHONE APPARATUS

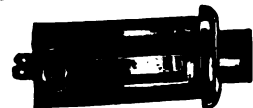
works better than other makes is easily seen when you look at the parts that enter into their construction.



"Justrite" Hook Switch

Sample prepaid 60 Cents.

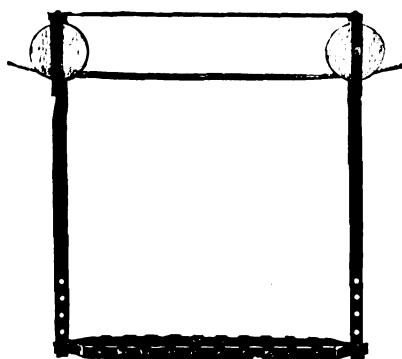
Send for one.



Sample prepaid
25 Cents.

"Workrite" Push.

S. H. COUCH CO.
162 Pearl Street, Boston, Mass.

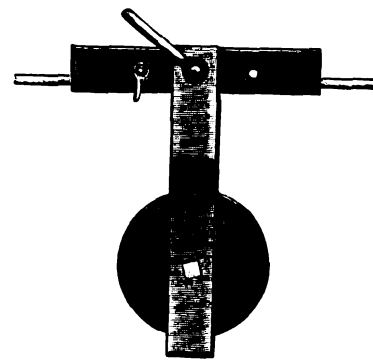
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co..... 37	Crumb, W. H., Co..... 34	Kellogg Switchboard & Supply Co..... 7	Roebing's, John A., Sons Co..... 32
American Electric Teleph. Co..... 40	Cunningham Iron Co..... 36	Klein, Mathias, & Sons..... 34	Sand Point Cedar Co..... 30
Am. School of Correspondence..... 39	Dickey Clay Mfg. Co., W. S..... 36	Leslie, A. C., & Co..... 12	Scovill Mfg. Co..... 2
American Vitrified Conduit Co..... 39	Eastern Telephone Mfg. Co..... 9	Lewis Lumber & Mfg. Co..... 33	Spargo, James A., Wire Co..... 34
Automatic Electric Co..... 11	Electric Appliance Co..... 3	Lindsay Brothers Co..... 32	Standard Underground Cable Co..... 12
Barr, W. J., Mfg. Co..... 12	Elkin Machine Co..... 33	McIntire, C. Co..... 36	Standard Vitrified Conduit Co..... 36
Beidler, Francis & Co..... 33	Ericsson Telephone Co..... 10	Maltby Lumber Co..... 29	Stanton, L. W..... 34
Bissell Co., The F..... 33	Fahnestock Transmitter Co..... 30	Michigan Cedar Co..... 33	Sterling, W. C., & Son..... 33
Burnley Battery Co..... 33	Fowler, John H..... 29	Middleton, J. W., & Co..... 34	Sterling Electric Co..... 5
Butterfield, J. F..... 34	Franklin Rolling Mill & Fdy. Co..... 31	Miller Anchor Co..... 34	Stromberg-Carlson Telephone Mfg. Co..... 4-10
Camp, The H. B. Co..... 39	Garton-Daniels Co..... 11	Monarch Telephone Mfg. Co..... 8	Swedish-American Tel. Co..... 12
Central Mfg. Co..... 39	Gest, G. M..... 38	Nagel, W. G., Electric Co..... 9	Telephone Printing Co..... 33
Central Telephone & Electric Co..... 5	Hemingray Glass Co..... 34	National Telephone Supply Co..... 35	Valentine Clark Co..... 30
Century Telephone Const. Co..... 5	Holtzer-Cabot Electric Co..... 34	National Wire Corporation..... 35	Vought-Berger Co..... 8
Chicago, Burlington & Quincy Ry. Co..... 34	Imperial Finance & Cons. Co..... 34	New Haven Novelty Machine Co..... 2	Wanted, Situations, etc..... 240
Chicago Insulated Wire Co..... 34	Indiana Rubber & Insulated Wire Co..... 3	Nungesser Electric Battery Co..... 34	Weston Electrical Instrument Co..... 34
Chicago Writing Machine Co..... 6	Ingram-Richardson Mfg. Co..... 12	Okonite Company..... 34	Wisconsin Timber & Land Co..... 33
Churchill, E..... 33	Index of the Technical Press..... 30	Pacific Coast Pole Co..... 30	Worcester, C. H., Co..... 29
Cohn & Book..... 33	Inland Steel Co..... 32	Pignolet, L. M..... 32	
Columbia Mfg. Co..... 33	International Telephone Mfg. Co..... 5	Pittsburg Lake Superior Iron Co..... 29	
Connecticut Teleph. & Electric Co..... 11	Keeling & Ridge Co..... 34	Pittsburg Sewer Pipe & Conduit Co..... 36	
Cook, Frank B..... 8			
Couch, S. H., Co..... 8			
BATTERIES.	Bissell Co., The F., Toledo, O.	Standard Underground Cable Co., Pittsburg, Pa.	Camp Co., The H. B., New York.
Burnley Battery Co., Painesville, Ohio.	Chicago Insulated Wire Co., Chicago, Ill.	CABLE SLEEVES.	Cunningham Iron Co., Boston, Mass.
Electric Appliance Co., Chicago, Ill.	Kellogg Switchboard & Supply Co., Chicago, Ill.	Nagel, W. G., Electric Co., Toledo, O.	Gest, G. M., Cincinnati, O.
Nungesser Electric Battery Co., Cleveland, O.	Nagel, W. G., Electric Co., Toledo, O.	New Haven Novelty Machine Co., New Haven, Conn.	Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	National Wire Corporation, New Haven, Conn.	CARD INDEX SYSTEMS.	Pittsburg Sewer Pipe & Conduit Co., Pittsburg, Kan.
BLANKS, BOOKS AND FORMS.	Okonite Co., New York.	Telephone Printing Co., Defiance, Ohio.	Standard Vitrified Conduit Co., New York.
Telephone Printing Co., Defiance, Ohio.	Roebing's Sons Co., John A., Trenton, N. J.	CIRCUIT CLOSERS.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
BONDS.	Standard Underground Cable Co., Pittsburg, Pa.	Garton-Daniels Co., Keokuk, Ia.	
J. W. Middleton & Co., Chicago, Ill.	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	CLIMBERS.	CONNECTORS.
BRASS.	CABLE HANGERS.	Klein & Sons, Mathias, Chicago, Ill.	Cook, Frank B., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.	Bissell Co., The F., Toledo, O.	Nagel, W. G., Electric Co., Toledo, O.	McIntire Co., C., Newark, N. J.
BOOTHES.	Cook, Frank B., Chicago, Ill.	CONDUITS.	Nagel, W. G., Electric Co., Toledo, O.
Yessera Mfg. Co., Toledo, O.	Nagel, W. G., Electric Co., Toledo, O.	American Conduit Co., Chicago, Ill.	CONSTRUCTION SUPPLIES.
CABLES.	National Telephone Supply Co., Cleveland, O.	American Vitrified Conduit Co., New York.	American Electric Tel. Co., Chicago, Ill.
American Electric Tel. Co., Chicago, Ill.			Electric Appliance Co., Chicago, Ill.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 240.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

Telephones "Eastern" Switchboards
LOCAL or COMMON BATTERY MAGNETO or COMMON BATTERY

Eastern Telephone Manufacturing Company

WRITE US

WEST CHESTER

PENNSYLVANIA

Ericsson Telephone Company

STRICTLY INDEPENDENT

MANUFACTURERS
AND IMPORTERS
OF

High-Grade Telephones

AND

Telephone Parts . . .

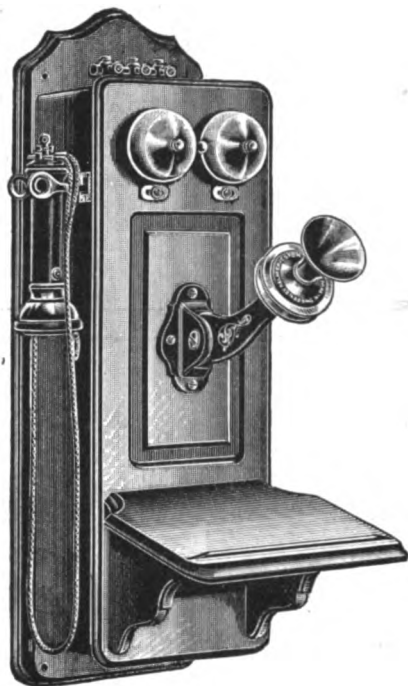
**For MAGNETO
and COMMON
BATTERY.**

Ericsson Telephones are
efficient, durable and of
superlative quality. Do
you want the **best**?

Send for booklet and enclose
2c. stamp for latest laughter
provoking novelty.

ERICSSON TELEPHONE COMPANY

296 Broadway, New York City



ADVERTISERS' DIRECTORY—Continued

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Rutterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 11.

The 1900 Dry Battery

THE most needed quality is reliability. No one wants a battery that will respond all right for a week or ten days then "suddenly go out of business." Another requirement is that it shall continue "strong" during its life. These two requirements besides many others are characteristics of

REMARK

1900 BATTERIES

We guarantee them not to freeze, leak or break; we warrant them to work with a strong steady current during their life (anywhere from six to eighteen months).

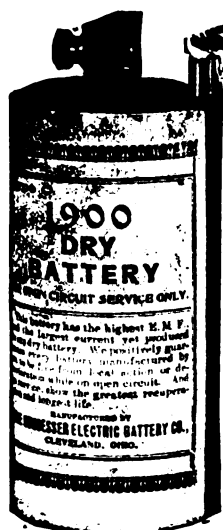
They are compact, always ready. They are better than wet batteries—no slop, no repairs, no breakage. Any one can replace a worn out one at a moment's notice. They can be carried anywhere—always ready for instant use.

Write us for our Complete List of Batteries and Telephone Supplies

STROMBERG-CARLSON TELEPHONE MFG. CO.

General and Eastern Sales Office
ROCHESTER, N. Y.

Sales Dept.
CHICAGO, ILL.



Automatic Telephone Service

IN

Lincoln, Neb.

THE new 3,000-station Automatic Exchange installed by the Automatic Electric Company for the Lincoln Telephone Co., began service on March 15th. The entire equipment was installed within six weeks after the exchange building was finished.

Thus, another large Western city throws off the yoke of telephone monopoly.

Are you interested? Write us.

**AUTOMATIC
ELECTRIC
COMPANY**

**CHICAGO
U. S. A.**

ADVERTISERS' DIRECTORY—Continued

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Franklin Rolling Mill and Foundry Co., Franklin, Pa.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

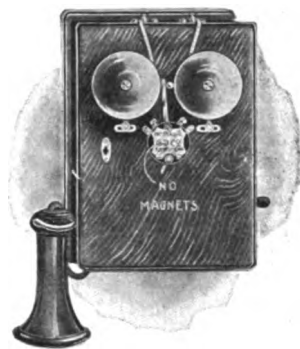
CONCLUDED ON PAGE 37.

No Magnets

You can't burn it out if you try

The G. D. DROP

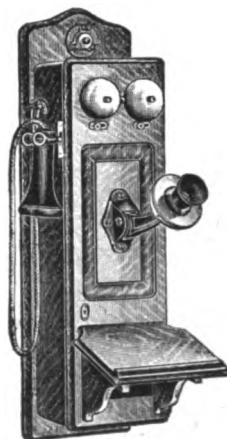
Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple. Durable. Cheap. *Pamphlet Do.*



GARTON-DANIELS CO., Keokuk, Iowa

10 YEARS Experience in the Manufacture of Telephone Apparatus

SHOULD WE NOT KNOW HOW?



Complete Equipment for

**Village Exchanges,
Country Party Lines,
Toll Lines,
Central-Energy Phones,
Private Plants,
Intercommunicating Phones.**

New Catalog No. 7 J sent on request. New prices.

No Better Transmitter can be made than the new

"CONN" SOLID BACK

Send for sample on trial.

We have moved into our new factory, which is the largest and finest equipped telephone plant in the East.

**Connecticut Telo. & Elec. Co.
MERIDEN, CONN.**

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK



No. 19 Receiver

YOU MAY THINK

you know all about telephones, and yet have never investigated the merits of our product. Take a hint from us and investigate. Our apparatus is the result of industry and sound practice, and represents true mechanical value in every detail.

AN OPPORTUNITY

is all we ask. We can convince you of the superiority of our equipment. Get our prices and specifications before placing your orders.



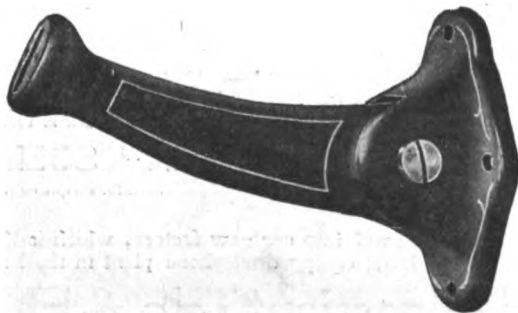
**SWEDISH-AMERICAN
TELEPHONE COMPANY**
CHICAGO ILL.



No. 19 Receiver

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



A Good Sign!

appeals to superstitious people. Our

Enameled Iron Telephone Signs

attract everybody. No pay-station complete without one. Ours are the BEST.

Send for prices and description.

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

MAGNET STEEL

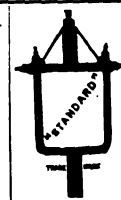
Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 163 Randolph St., Chicago, Ill.

Telephone
Wire



and
Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables Aerial-Underground-Submarine Lead Covered Cables

TERMINALS-STEEL STRAND-HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, APRIL 9, 1904

NUMBER 15

A UNIQUE CORDLESS SWITCHBOARD

BY P. KERR HIGGINS.

OF all parts of a switchboard, experience shows that the cords contribute the largest share of the troubles and difficulties of maintenance and have always been regarded as the bugbear of the wire chief. In warm weather the moisture of the operator's hands is likely to short circuit the conductors. The braiding is constantly wearing and giving out, the conductors of spiral and tinsel often short circuit in such a manner as to almost elude detection, for in one position they might be closed while with the slightest motion the difficulty will develop. For these and many other reasons too familiar to the experienced telephonist to need repetition, the cordless switchboard is the only logical type for certain installations. The earliest boards were, indeed, constructed upon this plan, for they were nothing more than the familiar telegraphic arrangement wherein each line is represented by a long brass or copper strip which is set at right angles to each of the other ones, and thus the simple insertion of a metallic plug can easily interconnect two pairs of circuits. It is, therefore, easy to see that with the multiplication of lines such an arrangement will become far too cumbersome and intricate to be of commercial value. Nevertheless, from time to time, small cordless switchboards have been constructed. It is upon this principle that most of the automatic exchanges endeavor to operate.

Cordless switchboards are particularly desirable where the serv-

nection is made by means of a plug being inserted between two insulated strips of brass, the act of doing so presses two inside springs against its own strip of brass, completing the connection. In Fig. 2 is seen a rear view of the board, showing the multiple-wiring of the jacks, etc. The sub-stations are local battery with a 2 m. f. condenser in series with the ringer, the exchange trunks being central energy.

The board was fully equipped at less cost than a central energy board of same size and is giving great satisfaction with practically no trouble whatever. It receives perhaps harder usage than any other board in this city, and this was one of the reasons why the proprietors requested a cordless board. Such a board is only practical for small private or private branch exchanges.

There are many other locations where a device of this kind would be eminently practical and even more eminently desirable, such, for example, as the numberless private branch exchanges and toll line stations where certain portions of the day it is desirable to connect trunk lines or toll lines through the office and to make them continuous. For purposes of this description nothing is so desirable as a cordless switchboard, for, if properly constructed, the cordless plugs will always make reliable and perfect contacts and will be uniformly exempt from the possibilities of open circuits which even with the most perfectly and

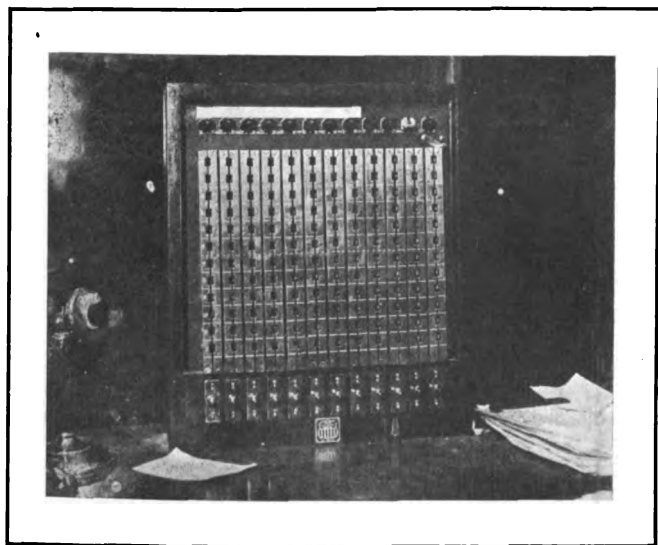


Figure 1. Cordless Switchboard Front View.

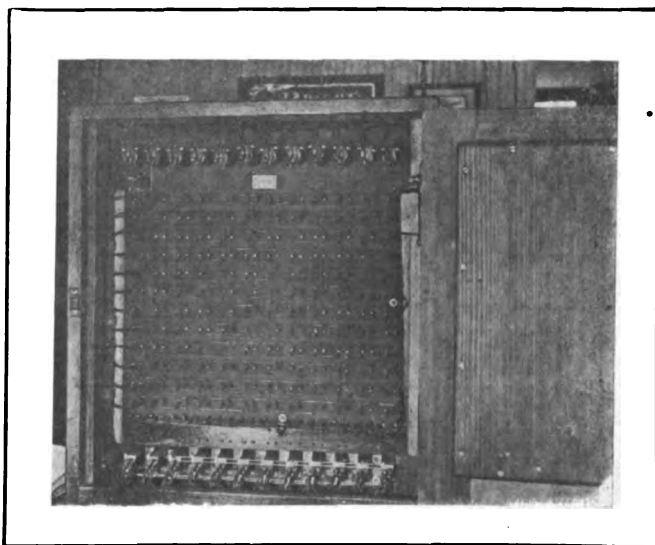


Figure 2. Cordless Switchboard, Rear View.

ice is frequent and severe, the board placed in unskilful hands and the number of lines to be interconnected not very great. To meet a situation of this description, the switchboard shown in Fig. 1 was designed by the writer to meet a special demand on the part of the Los Angeles Transfer Co., of Los Angeles, Cal., for a board which would take up the minimum space and be cordless, thus reducing the amount of trouble to the minimum. The dimensions of the board are 20" x 24" x 6" deep and it sits on a counter used for receiving orders from the public. It is equipped for ten sub-stations and two trunk lines, the equipment being interchangeable, permits of any proportion of local or trunks desired. The con-

substantially constructed cords and in the most rigid system of maintenance will sometimes occur. The case of toll lines is one particularly admitting of a cordless switchboard, for the importance of toll business far exceeds that of ordinary telephone intercommunication, and consequently the interruption to service added to the rupture of a cord is of far more consequence than upon the ordinary subscribers' line. Further, in the case of a broken cord upon a toll line, it is almost impractical for a distant station to signal the one at which the difficulty occurs, while, as in the ordinary exchange, it is a simple matter for the subscriber to go to a neighboring instrument and communicate with the exchange.

SOME NOVEL RECEIVER INVESTIGATIONS

By J. W. LATTIG AND CHARLES L. GOODRUM.

TO those of your readers experimentally inclined, or those desiring to audibly witness the passage of an electric current through a conductor without the usual concomitants of a magnet and diaphragm, which is, so far as the knowledge of the writers extend, the only known means of hearing the flowing current; the following experiments will doubtless be of interest:

Some years ago while experimenting along other lines one of the writers devised a plan, Fig 1, to demonstrate and compare

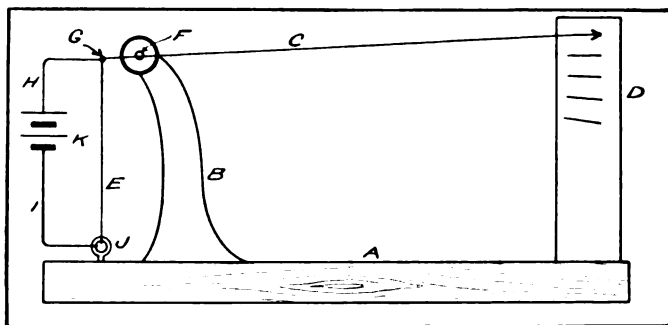


Figure 1.

the expansion of metals due to the heat of the electric current passing through the same.

Referring to Fig. 1, *A* represents a base provided with an arm *B*, to which is attached at fulcrum *F*, a long lever or pointer *C*, capable of moving in the fulcrum *F* in a vertical arc, the long or arrow end traversing the degrees *D*, which are merely empirical but spaced about sixteen to the inch.

To the short end of the pointer at *G* is attached two wires, *E* and *H*, the former being the wire under investigation and the latter the wire intended to conduct the current from the source of power *K* to one end of the experimental wire *E*; the other end of wire *E* is attached to the screw eye *J*, and by means of the screw eye may be adjusted until the pointer registers with the topmost degree. Also attached to *J* is a wire *I*, leading to the opposite pole of the source of energy. Under these circumstances it was found that with small wires *E* such as, say No. 30 copper, the expansion of the wire with even a single cell of carbon battery was most marked indeed, registering for copper several degrees, each time the circuit was completed and retiring to zero whenever it was opened. With other metals in place of wire *E*, different expansions were noticeable and an interesting and instructive comparison on the expansibility of various metals was made possible.

Some time since, this old experiment was in some manner brought back to the attention of the writers when it occurred to them that there were other and possibly more useful or commercial possibilities along the same lines; accordingly the following arrangement was devised, Fig. 2.

A is the shell of a telephone receiver, *B* is the usual cap, *C* the diaphragm and attached thereto electrically and securely, at point *G*, is a wire *H*, the other end being similarly connected to binding post *F* at point *E*; the binding post being so arranged that tension can be applied to the wire *H* and through it to the diaphragm *C*. At *D* is connected a wire to the diaphragm and another wire is connected to the binding post as shown. Now when these two conducting wires are attached to a source of current, the diaphragm *C* and the wire *H* form a portion of the conducting path, and the passage of the current through this circuit is not only plainly audible whenever the circuit is made or broken but more surprising still it actually approximates in sensitiveness the ordinary telephone receiver and most surprising of all, it will receive and reproduce speech. Our first effort to use it as an ordinary receiver was with a central energy system of that type in which the receiver is placed directly in the path of the current. In view

of our previous experiments and the conclusion that we had already naturally reached, namely, that we were dealing simply with the expansion and contraction of a metal due to heat, the alternate elongations and retractions of the wire *H* being communicated, we were scarcely prepared to credit our ears when we later discovered that a condenser might be inserted in the circuit without excessively modifying the results. We then continued our investigation as follows, from the results of which we are now inclined to the belief that molecular movement of some

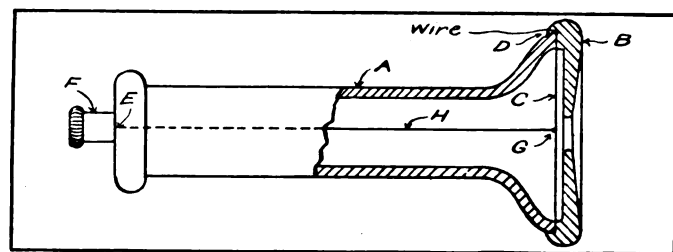


Figure 2.

sort rather than heat is the basis of the action. We reasoned that if five inches of wire produced a certain loudness of sound, ten inches should produce more, because the amplitude of the diaphragm movement would be increased by the greater expansion of that length of wire. This did not prove to be the case, but as the apparatus at hand did not admit of anchoring the end of the wire at the back end of the shell, we concluded that that fact was the cause of the failure. We then tried a coiled wire of German silver reasoning that that would be the equivalent of a longer wire. With this arrangement the results were mediocre and about that time we discovered much to our astonishment that it was wholly unnecessary to anchor the back end of the wire or to have either it or the diaphragm under

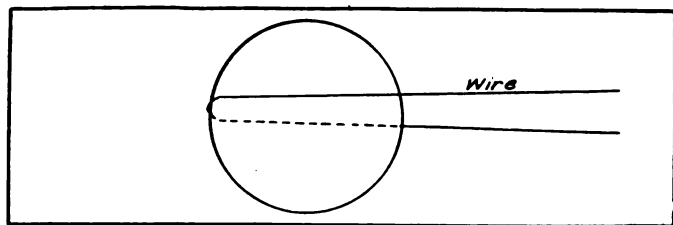


Figure 3.

stress as we at first supposed. These discoveries directed our attention to the molecular hypothesis and we accordingly tried the following: Discarding the wire *H* we substituted for the same a wire wound around the diaphragm as per Fig. 3, making it a part of the circuit.

With this plan we reproduced all the results of the previous methods which seemed to point more strongly to the molecular movement theory. The addition of more convolutions or the use of only a single wire drawn across the top of the diaphragm appeared to make no appreciable change, but with an additional diaphragm placed over the top of the other the loudness was increased.

Our experiments were limited to copper and German silver wire and to light iron diaphragms and we have often thought it would be interesting and possibly useful to follow up the line of investigation, but our time and attention being engrossed in other directions we have been unable thus far to do so. It is possible a receiver practically devoid of self induction and resistance might be devised and it is perhaps not beyond the bounds of possibility to produce a receiver more sensitive than the common permanent magnet type. What bearing would this receiver have had upon the telephone patents in 1876?

TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION*

By FRANK W. FOWLE.

THE use of aerial unsheathed cable is particularly to be avoided, because the wires of different circuits are within a fraction of an inch of each other, while all of them are probably twenty-five or thirty feet from the ground; and an inspection of formulæ (18) and (21) will show that between aerial grounded wires the constants of mutual inductance are a maximum when the distance between the wires is a minimum and the height above the earth is a maximum. Such aerial cables should be incased in a metallic sheath and the sheath grounded. This brings the

and more important, especially with the development of high tension transmission.

The theory of transposing a line exposed for a short distance to a two-wire line carrying a high energy alternating current is identical with the theory of transposition shown in Figure 5, where 3 and 4 shows how every telephone circuit should be transposed, and 1 and 2 represents the disturbing alternating current circuit.

The important feature is the manner of transposition when the exposure becomes complicated by the fact of transformers or arc-lights in the alternating current circuits and regular transpositions in the telephone circuits within the section of exposure.

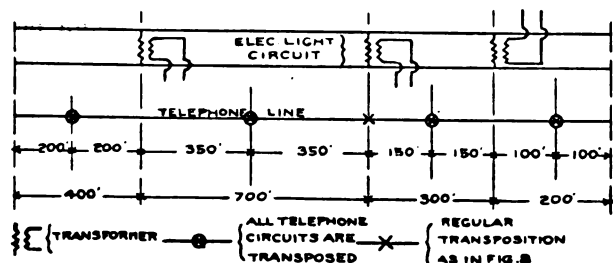


Fig. 9. Method of transposing telephone lines against constant potential electric light circuits.

ground so close to the wires as to make the induction no more serious than in the case of an open wire grounded line.

It is important to note that the use of phantom circuits in multiplex telephony requires not only the simple transposition of the lines themselves, but also the complete transposition of lines as a whole. For example: A phantom transposition would be the change of wires 1 and 2 to pins 3 and 4, and wires 3 and 4 to pins 1 and 2. The use of phantom circuits has never been extensive, and such transposition has never been required in practice. The phantom circuits which have been tried experimentally have seldom been satisfactory quiet circuits, owing to

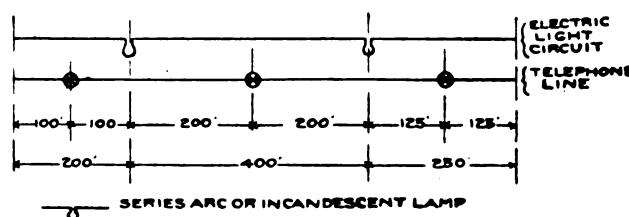


Fig. 10. Method of transposing telephone lines against constant current electric light circuits.

Figure 9 shows the manner of transposition for a telephone line exposed to an alternating current line to which are connected several transformers. The section between two consecutive transformers is to be treated as a section in which the mutual disturbances are to be caused to vanish. The reason for this is found in the fact that the magnetic disturbance in the telephone line is not constant, because the current in the alternating current line is changed at any point where a transformer is bridged on; and this change in current will vary throughout the day with changes in the load on the electric light system. It should be noted that points opposite the transformers are neutral points, that is, they are the junction of two contiguous sections, and transpositions

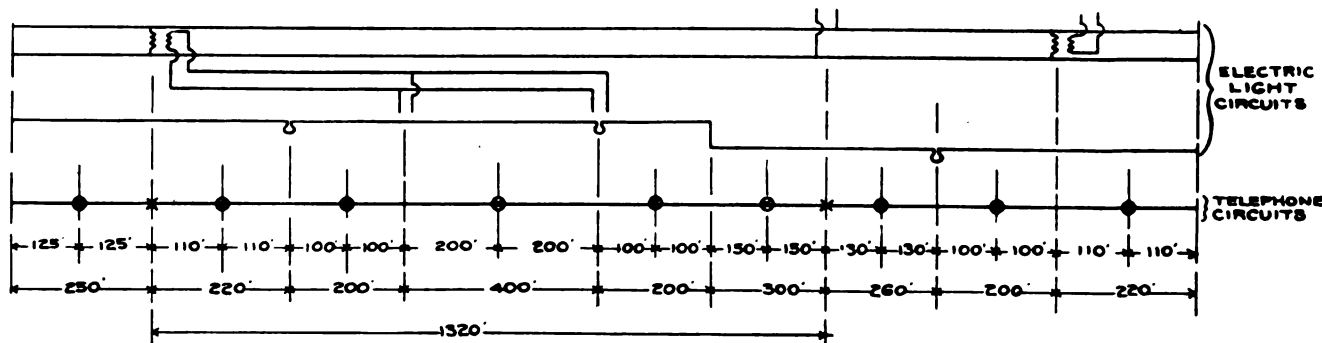


Fig. 11. Method of transposition in cases of complicated exposure to electric light and power circuits, combining the methods of Figs. 9 and 10.

the fact that the line was not properly transposed so as to make the phantom circuit mutually non-inductive with other circuits.

VII.—TRANSPPOSITION OF TELEPHONE LINES TO ELIMINATE INDUCTION FROM FOREIGN LINES OF HIGH ENERGY. THEORY OF THE METHOD IN THE SIMPLEST CASE. THE PROCEDURE WHEN THE SITUATION BECOMES TOO COMPLICATED,—USE OF TWISTED PAIRS, AERIAL CABLE OR ELECTROMAGNETICALLY SHIELDED CONDUCTORS.

The transposition of telephone lines as a whole, to eliminate induction from foreign lines of high energy, carrying either high potentials or large currents, is an exceedingly important branch of the subject of transposition. This matter is becoming more

at these points will not affect the disturbance in the telephone circuits. Therefore, regular transpositions in the telephone circuits, to eliminate cross-talk, should be located at these neutral points, if necessary. A slight deviation of the regular transpositions one way or the other from the exact points at which they should occur, may be neglected.

Figure 10 shows the manner of transposition against an arc-light circuit. The distance between two consecutive arc-lamps should be treated as a single section, to be transposed at the middle.

At points where transpositions are located to eliminate foreign induction, all the telephone circuits are to be transposed in every case. It is to be observed that the exposure to a single wire series arc-light circuit represents one of the worst cases of induction met in practice. The development of the alternating current series arc-light system has been extremely rapid, owing to its cheapness and to the flexibility with which it fits into a

* Paper read at the annual convention of the Association of Railway Telegraph Superintendents at New Orleans.

large alternating current system. Trouble due to these circuits is being met all over the country. When the exposure becomes more complicated, the method of treatment is outlined in Figure 11.

It will be seen by an inspection of Figure 11, that the length of exposure between two consecutive changes of any character in the circuits of high energy is treated as a special section, at the middle of which all the telephone circuits are to be transposed. The following general rule may be given to cover all cases.

Treat as one section the distance between two consecutive changes of any character in any of the distributing circuits. Transpose all the telephone wires at the middle of each such section.

These changes or discontinuities in the disturbing circuits occur wherever an arc-light, for example, is inserted in one of the circuits, where a transformer is bridged from one of the alternating current circuits, where any of the circuits changes abruptly its distance from the telephone circuits and where additional alternating current circuits, or where any of the disturbing circuits are transposed.

In the alternating current distributing systems, for electric light and power in large towns and cities, it is not general practice to transpose the distributing circuits. In the case of long-distance high-tension transmission, it is common practice to transpose the circuits. In two-wire single phase systems, or in four-wire two phase systems, the transpositions are usually made in the same manner as a standard telephone transposition.

In the case of three wire three phase lines, it is necessary to insert two transpositions in one non-inductive section. This is accomplished by transposing the line at a distance one-third of the total from one end and at a distance two-thirds of the total distance from that end, by rotating the circuit one-third of a revolution at the first transposition and an additional one-third of a revolution in the same direction at the second transposition. Where such spirals, as they are termed, occur within the section of exposure to telephone lines, the spirals should in general be treated as discontinuities and made the location of a neutral point with reference to the telephone transpositions.

In general, in transposing against electric light induction, or induction from power lines, it is well not to depend upon transpositions in the power or electric light circuits. The advantage thus secured is that of making a telephone system completely dependent on the properties of its own lines only and not on the properties of some line or lines not associated with the telephone system. It is advisable in all cases, and usually absolutely necessary, to make a thorough inspection of the exposures before transposing the telephone circuits. Such inspections should be made by men who understand electric light and power practice, as well as telephone practice. Also, it is advisable to make a few simple calculations of the probable values of induced currents and E. M. F. in the telephone circuits. These values will not be constant throughout a day of twenty-four hours, unless the load on the disturbing system is likewise constant. These calculations may be made from the formulæ given above.

Experiments which have been made to determine the permissible current in a telephone receiver at commercial frequencies, which will not interfere with telephonic transmission, show that a current of approximately 5×10^{-8} ampere is permissible. This will vary slightly with the frequency of the disturbing current, its wave form and the sensitiveness of the telephone employed.

The value given is a safe value in general practice. It is obvious that receivers of low power and transmitters of maximum power will give the most satisfactory service.

The worst case of induction is probably that of a single wire arc-light line directly beneath or beside the telephone line. The cases which give comparatively little trouble are those of metallic alternating circuits at a distance of thirty-five or forty feet from the telephone line, such as would occur, for example, when the telephone line is on the opposite side of the street from an alternating current line. Such an exposure usually has to exceed a mile in length before it becomes serious. An exposure to a

single wire arc-light becomes serious for a length of only a few hundred feet, if the arc-light line is close to the telephone line.

In cases where the exposure is to such a complicating distributing net-work that transpositions occur so frequently, if laid out in accordance with the above rules, that they are impracticable, it is necessary to resort to the use of twisted pair, insulated wire, aerial cable or electromagnetically shielded conductors. Shielding the wires with a metal coating has been found effective in certain cases. This, practically, is the only thing to do with grounded telephone circuits, but it is injurious to the telephone transmission.

It will often be found that the disturbances from an alternating current system occur only at night, or at certain stated intervals in the day, although twenty-four hours' service may be given on the disturbing system. This is usually conclusive evidence that the disturbance is electromagnetic rather than electrostatic and the treatment outlined above may be modified in such a manner as to eliminate the magnetic induction, paying particular attention to points where the current changes in the disturbing line.

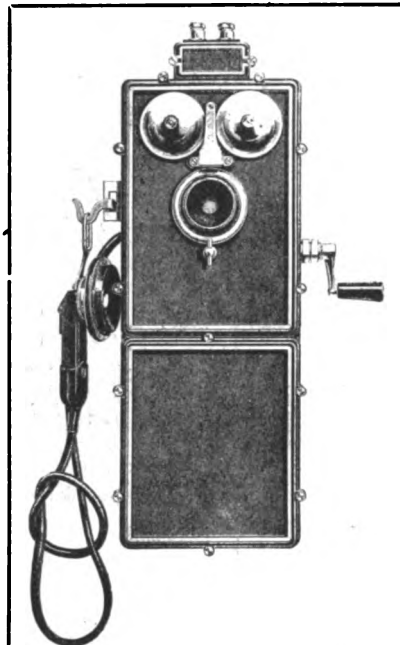
Where the induction is slight, it is not always necessary to cut in all the transpositions which the foregoing theory shows to be necessary to secure complete silence. It is possible to calculate theoretically what shall be necessary. If it is inconvenient or inadvisable to spend the time for this, a complete system of transpositions may be

laid out and part of them cut in experimentally until the disturbance is sufficiently reduced. This is more or less a cut and try method and the best results will always be secured by a complete solution of the case before any work is done and then securing the immediate installation of the complete system of transposition, without wasting time in experimental work, the results of which may be doubtful.

(To be continued.)

A TELEPHONE PRODUCE EXCHANGE.

A RURAL produce exchange established by the Penn Yan Telephone Company for the use of its rural patrons is the latest novelty in the telephone world. Here is the idea: A party living on a certain line has produce he wishes to sell. He calls up the produce exchange, giving the number of his telephone, and states what he has to sell; this information is placed on the blackboard. If another party on another line wishes to purchase something he calls up the produce exchange and asks what is for sale and what the prices are. That party is then given the telephone number of the owner, and the party can call and find what he wants without searching all over the country. The idea was conceived by Manager A. M. Taylor, of the Penn Yan exchange, and is one that is much appreciated by those living in the rural sections.



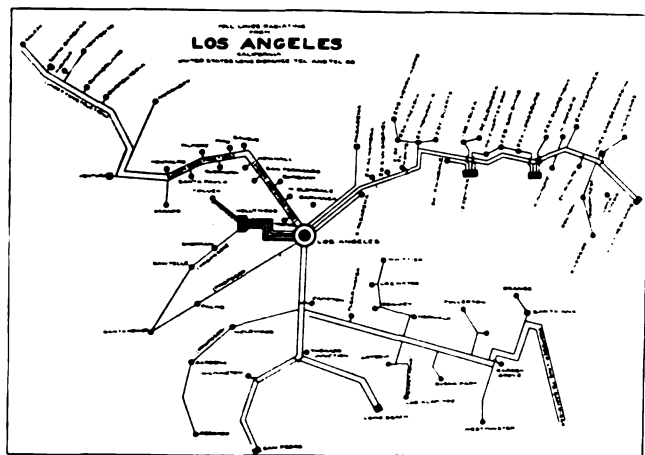
A GERMAN WATER-TIGHT TELEPHONE.

This is a German design for an instrument to be used in mines, around docks, and other places where the moisture is apt to work inside of the box and make trouble. The case is of cast iron and is absolutely water-tight, rubber gaskets being used at the joints. The receiver is also made water-tight. It will be noticed that the receiver cord is provided with a leather covering which will protect it from the rough usage which the instrument is designed to withstand.

INDEPENDENT EXCHANGE FOR PASADENA, CAL.

PASADENA, the Mecca for tourists to California, is a city of 10,000 inhabitants, located in the foothills of the Sierra Madre Mountains, twelve miles northeast of Los Angeles. The telephone plant has been under construction for several months, the Empire Construction Co., of Toledo, Ohio, being the builders. F. F. Graves is general manager. There are ten circuits connecting Pasadena with Los Angeles, and these will be increased at an early date.

The building, shown in the photograph, is built on the Mission

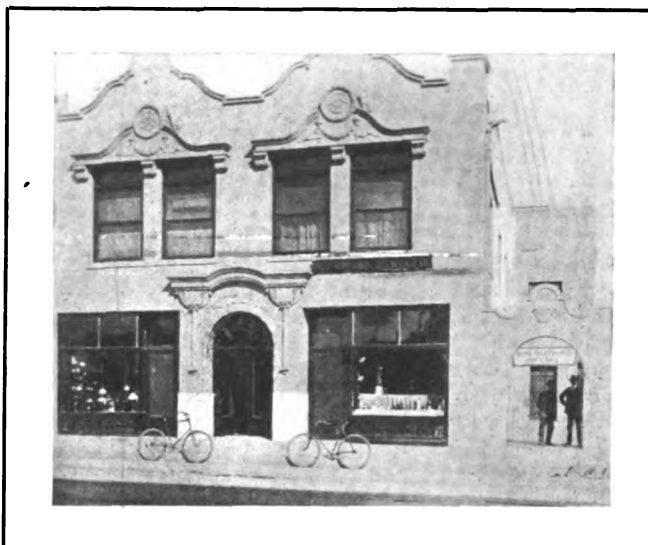


Map Showing Toll Lines Radiating from Los Angeles.

style. The stores in front and several rooms upstairs are rented. In a large room in the rear of the building is the switchboard, and the chief operator's desk. Several rooms are provided for operator's rest, kitchen, cloak room, toilets, etc. The terminal room power board, store-room, battery room and general offices are located on the first floor in the rear. The accumulators are similar to those in use at Los Angeles and have a capacity of 160 ampere hours. The switchboard is equipped for 1,440 lines; the ultimate capacity being 7,200. All lines are multiplexed throughout, as are also ten trunks to the toll desk. Provision is also

made for a night toll position on the main board. A two position chief operator's desk is furnished with the equipment. The form of protector used is Cook's latest, which affords a means of opening each circuit at the protector for the purpose of testing.

The outside construction is standard with Los Angeles and other points on the coast. Duplex pins are used throughout, and well selected poles varying from 30 up to 50 feet. Underground



View of the Home Telephone Company's Building in Pasadena, California.

cables are installed in the business district and are of 300 pairs each. These are extended by aerial cables of 150 pairs. Very little 100 or 50 pair cable was used. Multiple distribution is used throughout and Cook can tops for pole terminals. Copper wire No. 2 E. L. S. has been used exclusively and No. 10 E. L. S. for the trunk or toll lines to Los Angeles. A branch exchange is installed in the Hotel Green of 300 lines, with ten trunks to the main office. The Pasadena plant was opened March 7th.

IMPEDANCE AND RETARDATION—ARTICLE IV.

BY ARTHUR VAUGHAN ABBOTT.

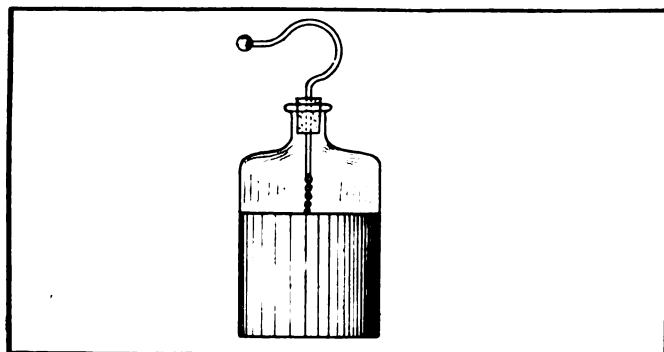
THERE is another property inherent in all electrical circuits which plays a very important rôle in the amount of current which is transmitted. This property is that of capacity. It has been found by experiment that all conductors are able to absorb and hold a certain quantity of electricity, and in this respect every conductor behaves as if it were porous and if electricity was a substance of some description, and actually soaked into and remained absorbed in the material forming the circuit. A familiar illustration of capacity is that of a Leyden jar (Fig. 7a), which consists of a bottle or jar, usually made of glass, that is partly covered both inside and out with tin foil. Now, if these coatings be connected with the poles of an electric generator a certain amount of electricity will apparently flow into the jar and remain there, and it is a common experiment to thus charge a Leyden jar and subsequently to take a shock by touching the terminals.

The ability of every conductor to thus store electricity is termed *capacity*, and we find by experiment that capacity depends upon four things: First, the area of the conductor; second, the electrical pressure (voltage) of the generator which is used to charge it; third, upon the nature of the insulating medium which sur-

rounds the conductor; and fourth, upon the distance between the conductor and neighboring bodies. The first law of capacity thus stated would seem self evident because it is quite rational to believe that the larger the conductor the more electricity it could accumulate. But the law is that capacity is proportional to the *surface* and *not* to the *volume* of the conductor. If electricity were stored in the substance of the conductor itself the quantity of electricity would evidently be proportional to the volume and not to its surface, and thus a sphere could retain more electricity than any other geometrical form. But we now believe that the electricity is not held in the *conductor*, but, on the contrary, is retained by the insulating medium which surrounds it, and that really the only part the conductor plays is that of spreading the electricity over the substance which insulates. This is proved by constructing a Leyden jar with coatings made of tin, which can be removed at pleasure. If the jar be charged and the coatings are taken off with insulating handles they may be handled with impunity and not the slightest indication of electricity discovered. But if they be replaced on the jar and then touched the familiar shock is experienced. So the electricity is shown to reside in the glass and not in the conductor. If this view be true it is easy to understand

why the capacity of a circuit is proportional to the area of the conductor and not to its volume.

By the second rule capacity is proportional to the electromotive force, and in this respect electrical capacity is quite different from hydrostatic capacity. Under electrification every body behaves as



if it were elastic, and the greater the electromotive force the more electricity it can hold. We may liken this to the capacity of a rubber bag for water, for if such bag be filled from a tank with a low head it will take up less water than if attached to one with a high head. Every electrical capacity behaves in precisely a similar fashion.

Electrical capacity is found to be proportional to the nature of the insulator that surrounds the conductor. We know of no explanation for this law, and can only say that experiment shows such to be the fact. We find that when a conductor is surrounded by air it will hold less electricity than if it were surrounded by almost any other substance; hence *air* having the least *specific inductive capacity*, as it is called, is taken as the unit and the electrostatic capacity of all other insulators measured in terms

compared with air. Table 1 gives the specific inductive capacity of the more common substances used as insulators.

It is also found that the capacity of any circuit is inversely proportional to the thickness of insulating material which separates the two sides of the line. Thus, in the case of an open wire telephone line, if the wires of the circuit are run upon the outermost pins of a 10-foot cross arm it will have notably less capacity

TABLE 1.
SPECIFIC INDUCTIVE CAPACITY.

India Rubber...	3.15 to 3.48
Glass from....	2.15 to 4.5 depending upon its density.
Mica	6.33 to 8.00
Paraffine	1.68 to 2.32
Porcelain	4.38
Shellac	3.10

than if the circuit runs upon two pins which are adjacent to each other. In modern telephony the use of appliances specially made to possess large capacity called condensers is growing rapidly, and every telephonist is familiar with the condenser used at the subscribers' sub-station. From the preceding laws governing capacity the method of making such condensers will be readily understood.

The condenser consists of two sheets of thin tin foil, which are separated by one or two thicknesses of paper boiled in paraffine. Evidently the tin foil presents the greatest surface with the least volume of metal. The paper is the thinnest insulator which can be interposed between the sheets of foil, and when saturated with paraffine is impregnated with the insulator having the greatest specific inductive capacity of any substance which can be obtained at reasonable expense, so the design of the sub-station condenser is one to obtain the maximum capacity with a minimum expense and bulk.

TELEPHONE CONNECTION NOTIFICATION

THE accompanying drawing is a reproduction of the face and reverse sides of a private mailing card that some of the large telephone companies have found to be efficient. In some instances in the larger cities, where the population is largely transient, the companies find that it does not pay to place

cities, where telephone companies place a pay station telephone in every room in a hotel or in every flat in an apartment house. Such subscribers as would use these telephones are always changing, and it would be a great waste of money to try to get their names into the regular directory.

Private Mailing Card

AUTHORIZED BY ACT OF CONGRESS OF MAY 19, 1890.
(POSTAL CARD-CARTE POSTAL)

PLACE
POSTAGE
STAMP
HERE.

Mr. _____

THIS SIDE FOR THE ADDRESS

Homeville.....190

This is to inform you that the

Homeville Telephone Company has just

installed for me in my.....

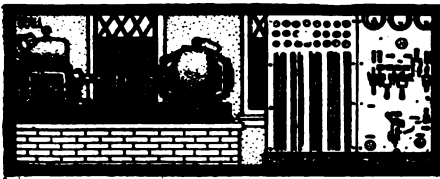
at.....*a telephone*

the number of which is.....

Signed.....

in their directories the names of all their party line subscribers, because often before the directory is even from the printer the subscriber may have moved away and discontinued service. Instead of putting the subscriber's name in the directory, the companies will supply him with as many cards, after the form of the one shown, as he wishes. On this card the subscriber may fill in his telephone number, sign it, and then can mail it to any one who would be apt to wish to talk with him. The usual number of cards given is some place between 50 and 100. The companies find that this pays them well. Some companies furnish such cards to all subscribers immediately on their connection with the exchange. This plan is of particular value in the larger

JAPANESE TROOPS USE TELEPHONE.
THE Japanese are great believers in the value of the telephone for governing the movements of skirmish lines and of troops operating rapidly at some distance from the main body. During the war with Corea, in 1894, on the day following the battle of Ping Yang, the Japanese Signal and Telegraph Corps completed a temporary line from Seoul to Ping Yang, a distance of seventy miles, and sent messages over that line in rapid succession. One factor of material advantage to the Japanese in the matter of rapid construction is that they use poles of bamboo, which are exceedingly light and easily transported.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



TRUNK CIRCUIT QUERY.—(311.)

Your answer to inquiry 294 does not make it quite clear to my mind how the click you refer to is produced in the operator's receiver. P. O. U.

The 600 ohm winding of the order wire pilot relay is bridged permanently across the order wire circuit that connects with the trunk operator's telephone set. As will be seen by referring to Fig. 311, this produces a closed local circuit through the secondary winding of the induction coil and the operator's head

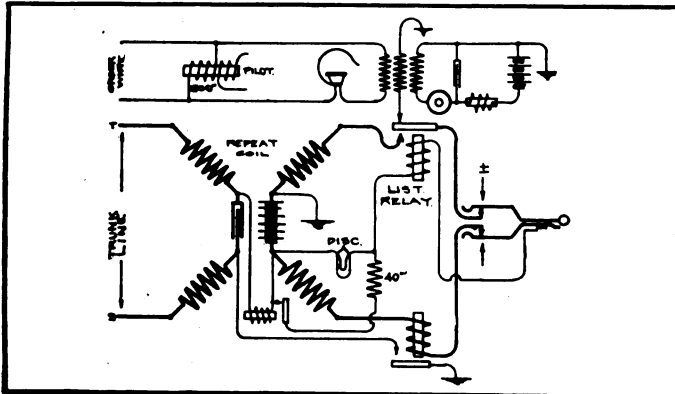


Figure 311.

telephone. When the operator touches the tip of the plug to a busy jack, there is a flow of current through the test winding of the coil which induces a flow in the secondary and thus causes the click in the receiver.

EDISON'S CARBON TRANSMITTER.—(312.)

Wherein did "Edison's Carbon Transmitter" differ from the modern solid back? Were they not about the same? T. S. I.

Your question can best be answered by giving you a sectional drawing of the Edison transmitter which is shown in Fig. 312. *D* is the vibrating diaphragm against which presses a small button *K* of ivory, leaving attached to its rear face a thin platinum disk *h*. In the rear of the casing of the instrument is an adjustment screw *E* having an enlarged head *c*, which car-

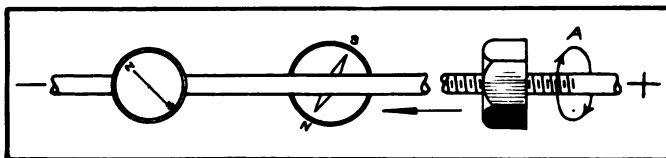


Figure 312.

ries on its front surface another thin disk of platinum *f*. Between these two disks is placed a cylindrical button *g* of compressed lamp black. The two platinum disks form the electrodes of the transmitter. The current variation is obtained by the change of resistance of the lamp black button under the varying pressure of the ivory button.

POLARITY OF A CONDUCTOR.—(313.)

There is a method of telling which way the current is going in an electric wire which I have seen. Can you show me this? C. D.

Here is one way. Refer to Fig. 313. A conductor carrying current is conceived to be surrounded by magnetic whirls, one of which is shown at *A*. These always revolve in the same direction around a conductor as a nut would on a right hand threaded conductor if the nut were traveling along the conductor in the direction of current flow. If a compass be placed either above or below a conductor its north pole will be deflected in the direction in which the magnetic whirl rotates. The pole from which the current flows, or the positive, can then be easily determined.

A NOISY LINE PROBLEM.—(314.)

We have a grounded line forty miles long which is quite noisy. Do you

think it would pay us to put a coil on it as described in Query 254? Should the coil be placed at the center of the line? S. L. H.

Our answer to query 254 was made as an explanation of the operation of the coil alluded to, and should not be taken in any sense of the word as a recommendation for its employment. To put on a coil such as you describe might aid you in quieting the line, but it probably would not give you satisfactory service. Where to locate the coil can only be proven by experiment.

BLAVIER'S GROUND TEST.—(315.)

Please explain Blavier's test for locating a single ground on a single wire by alternately grounding and freeing the far end of the defective wire. I. N.

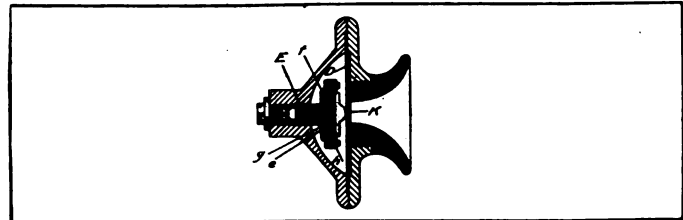


Figure 312.

Refer to Figs. 315a and 315 b. Let *AB* be the line which has a fault *f* at *C*, *A* being the testing station. *A* first gets *B* to in-

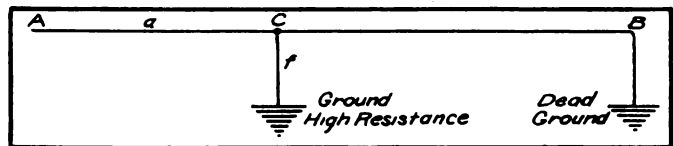


Figure 315a.

sulate his end of the line. He then measures the resistance, which we will call *l*, then,

$$a + f = l;$$

therefore

$$f = l - a. \quad (1)$$

Next, *B* puts his end to earth, and *A* again measures. Let the

new resistance be *l*₁, then $a + \frac{bf}{b+f} = l_1.$ (2)

Calling *L* the resistance of the line, we have also $a + b = L.$ Therefore $b = L - a.$ (3)

From these three equations we have to determine *a*. Substituting in (2) the values of *f* and *b* obtained from (1) and (3),

$$\text{we get } a + \frac{(L-a)(l-a)}{L+l-2a} = l_1;$$

$$\text{therefore } a^2 - 2a l_1 = L l - L l_1 - l l_1;$$

from which, since *a* must be less than *l*, and the root consequently negative,

$$a = l_1 - \sqrt{(l - l_1)(L - l_1)}.$$

FOR EXAMPLE.—A faulty cable, whose total conductivity resistance when perfect was 450 ohms (*L*), gave a resistance of

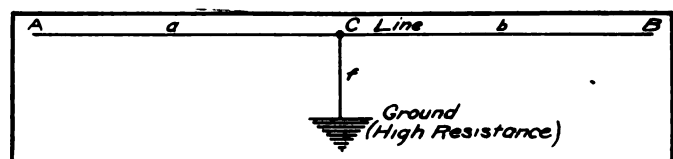


Figure 315b.

350 ohms (*l*) when the further end was insulated, and 270 ohms (*l*₁) when the end was put to earth. What was the resistance of the conductor up to the fault?

$$\text{Resistance} = 270 - \sqrt{(350 - 270)(450 - 270)} = 150 \text{ ohms.}$$

If the length of the cable were 50 miles, then conductivity per mile equals $\frac{450}{50} = 9$ ohms, and distance of fault from testing

$$\text{station consequently equals } \frac{150}{9} = 16 \frac{2}{3} \text{ miles.}$$



THIS THE BEGINNING
OF THE END.

THE LEGAL OWNERSHIP
IS COMPLETE.

THE decision of the circuit court of Cook county in the notorious Kellogg Switchboard and Supply Company litigation, marks the beginning of the end. It was an official and unprejudiced announcement of a condition of affairs which has been so persistently set forth by **THE AMERICAN TELEPHONE JOURNAL** during the past few months; namely, that the Kellogg concern was completely in the control of the Bell people. The litigation in question was a suit brought by minority stockholders to have the sale of the Kellogg stock set aside, and to restrain the majority stockholders from managing the Kellogg business.

The court has decided that whatever the allegations of fraud and whatever the purpose for which the stock was purchased, "the agent had full power to make the sale," "the legal ownership of the stock is complete," and "Kellogg can in no event have the stock restored to him."

In the decision the expected has happened. The result was felt to be a foregone conclusion by all who have been watching the case. Yet, while the suit has been pending there remained this one small loophole of escape from a difficult and unsavory predicament. This decision of the court clears the atmosphere in telephone circles and it settles more than the points at issue. It determines the fate of the Kellogg Switchboard and Supply Company.

There has been some difference of opinion as to whether in the transfer of the Kellogg stock into the hands of the great rival and foe of Independent telephone operators Kellogg himself was defrauded. The sale which has caused such disturbance was made by his agent during his absence from the State. How far Kellogg was concerned in the affair does not matter in considering the results. The court has said that this agent had full power to make the sale and that settles it.

Therefore whatever the ethics and morals involved in the transaction and notwithstanding that the fact of the sale was kept secret as long as possible, the transfer was legal and the stock cannot be reclaimed. Had Kellogg considered himself defrauded and had he desired to have the action of his agent rescinded, the court says that he should on discovery of the fraud have announced his purpose and adhered to it. He did not act promptly on learning the facts, but, quoting from the learned judge's opinion, "on the contrary, treated the money as his own and the stock as the vendee's."

One thing we do know and a decision of a court of record is not necessary for its demonstration. Fraud on the public was intended and was perpetrated and the injury of Independent telephone companies was certainly attempted. This particular

fraud does not concern the sale itself but the attempt to keep the telephone public in ignorance of it. A wolf has been masquerading in sheep's clothing. A Bell concern has been posing as an

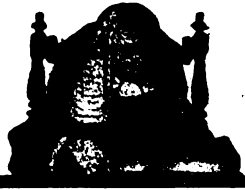
Independent; an enemy has been asking for business as a friend. Had the true situation not been discovered and persistently exploited, great injury to Independent telephony might have resulted.

The court, then, settles the point that "Kellogg can in no event have the stock restored to him." There is no misunderstanding that statement. "The legal ownership of the stock is therefore complete," says the judge. Who owns this stock of a once Independent manufacturing company? Who is it that has complete possession of a concern which formerly had the confidence of Independent operators and to whom many of them looked for their equipment and supplies?

Here is the full point of the controversy as far as **THE AMERICAN TELEPHONE JOURNAL** is concerned. Two-thirds of the stock of the Kellogg Switchboard and Supply Company, once a reputable Independent concern, is declared by the circuit court of Cook county, to be completely in the possession of the great enemy of Independent telephony everywhere, the Bell telephone monopoly, which in this particular instance is described under the name of the Western Electric Company.

Therefore we say that this decision marks the beginning of the end, as regards the business of the Kellogg Switchboard and Supply Company. It cannot for a minute be supposed that Independent operators will have anything to do with a company which has been declared by the courts to be a Bell concern. The company may have been able to throw dust in the eyes of Independents to some extent in the past, but little business of this character may be expected in the future.

To be sure, much of the effect of this decision has been discounted by far seeing operators from the time **THE AMERICAN TELEPHONE JOURNAL** first began sounding the alarm. The success of this coup on the part of the Bell people depended upon the secrecy which attended the transaction. Publicity would be, not instantly, perhaps, but progressively fatal. This is what has happened. Working in secret as an Independent concern while owned by the Bell monopoly, the Kellogg Switchboard and Supply Company was a constant menace. As soon as **THE AMERICAN TELEPHONE JOURNAL** and other Independent publications turned on the search light of publicity, its business fell off and has continued to decrease from that time to this. There is no longer a shadow of an excuse why Independent operators should lend aid and comfort to the enemy and work against their own interests by keeping alive this wreck of a once reputable company.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

NO RIGHT TO MOVE BUILDINGS.

A MAN in Wisconsin bought a building and is now moving it. He claims he has the right of the public highway, and all wires interfering with the moving of the building he has a right to tear down. He also claims he has the right to trim trees to the tree banks. This building is 35 feet high, 26 feet wide. He also claims that wires must be 60 feet above the ground in this State. We claim we have a right to collect all the expenses incurred by such moving. Please advise us.

THE moving of buildings is not one of the purposes of a street. The purchaser of the building therefore has no right to demand the removal of your wires to make way for his enterprise nor to trim trees that interfere with it. You undoubtedly have the right to collect from him the expenses his moving causes you. This is true unless the Wisconsin statutes, which are not accessible at present, command your wires to be 60 feet from the ground.

WHEN A LICENSE IS IRREVOCABLE.

MR. W. L. CARY, of the Federal Telephone Co., Cleveland, Ohio, submits the following interesting discussion of the question, When a license is irrevocable.

"My attention is called to the answer, under the heading of 'The Telephone in the Courts,' of the first question in your issue of March 19th. The question is a very important one to almost every company operating lines of telephone or telegraph in the United States, at least in those States where such lines are held by the courts to be an additional burden or servitude upon the freehold of an abutting property owner, where the same are built along public highways. The question seems to be whether, having secured a right or license to build a telephone line of a given property owner who thereafter disposes of his property, such right, license or permission is binding upon the purchaser of such property having been so sold.

"The answer to this question refers to a decision which, apparently, has nothing to do with the determination of the question, but merely as to whether such construction is an additional burden upon the freehold, where the abutting property owner owns to the center of the highway. The answer further seems to intimate that only in the case of the telephone company having secured its rights and privileges by an instrument amounting to a deed would the same be irrevocable. In fact, it is stated that a license is revocable at any time. A statement so important and so misleading should not go unchallenged because of the immense interest at stake and the evident discomfiture of nearly all of the companies which certainly have no other or better right of any than mere licenses.

"While it is generally accepted doctrine that licenses are revocable at will, it does not apply in cases where the one to whom such license is given has acted upon such license, expending large sums of money, or at least placed himself in a worse position because of same, or where such license is founded upon a consideration. It would be a strange doctrine if one were permitted to give a license one day and the licensee, having acted upon it by constructing its telephone line, connected up subscribers, made contracts with them for telephone service, and then the licensor be permitted to revoke such license and order the removal of such poles and fixtures. The licensor, knowing the character of work anticipated must limit the duration thereof or the right continues at least the life of such construction. Numerous cases can be found where a license has been secured to flow water upon lands growing out of the construction of a dam for mill purposes, and without a consideration, in which the courts have enjoined the abatement of such dam and refused relief to the licensor.

"I have in mind a company which has expended nearly one hundred thousand dollars for right of way, evidenced only by mere licenses from abutting property owners, which, if revocable at the caprice of the licensor, might put the company out of business, although operating over several States.

"Perhaps the one answering this question had the idea that it was necessary that such rights be acquired by deed and recorded in order to be notice to the subsequent purchaser. This, to be sure, would be constructive notice, but constructive notice is not necessary where there is actual notice by occupation and operation under such a license. In fact, this is much better notice than a mere constructive notice, growing out of the recording of such an instrument. Licenses are usually in the form of a simple permit signed by the licensor but not acknowledged, and, therefore, not subject to record under the laws of the several States. To secure deeds of rights of way would be quite out of the question, as the formality attending the execution of such would arouse great suspicion on the part of the property owner. There seems to be so much misinformation about the subject of the rights of a licensee, and the large amount of expense and annoyance entailed upon

telephone companies should they be led to believe that licenses are revocable at will by the licensor, makes the subject of such importance that it seems to the writer advisable to especially call the same to your attention."

To a person not interested in the securing of rights of way for telephone companies, the suggestion that "to secure deeds of right of way would be quite out of the question as the formality attending the execution of such would arouse great suspicion on the part of the proper owner," has a slightly sinister appearance. Does the advantage of securing a license, instead of a deed, from the innocent property owner lie in the fact that he is not led thereby to suspect the valuable and permanent character of the grant he is making?

TWO INJUNCTIONS AGAINST ONE COMPANY.

INJUNCTION suits have been begun against the American Telegraph and Telephone Company by J. J. Coulter and C. N. Hutchinson, of Coulterville, Tenn. Both allege that the company in each secured a right of way over complainant's land by false representations, which in Coulter's case were that Hutchinson had granted a right of way and in Hutchinson's that Coulter had granted a right of way. The complainants allege that the statements in both cases were false. Both suitors ask that the company be restrained from taking further possession of the right of way by turning on an electric current.

Hutchinson in his bill sets forth that at the time of making the contract he had not complied with the law by registering a copy of its charter in the county register's office and that the company is now insolvent in the State of Tennessee. He insists that the contract is voidable because the easement is not specifically set forth. He asks that the contract with him be cancelled.

MUNICIPAL TELEPHONES AND A MONOPOLY.

THE Railway Commission of Ontario has delivered judgment in the appeal of the towns of Fort William and Port Arthur to compel the Canadian Pacific Railway Company to admit their municipal telephones to the depots, despite a contract giving a monopoly to the Bell Telephone Company.

Hon. A. G. Blair, chief commissioner, said he had been unable to conclude that such an agreement was not a legal contract, and cited decisions of the English courts, including several by Lord Hershell. The contract was a natural and reasonable one for the transaction of business. The Municipal Telephone Company could overcome the business difficulty arising from want of direct communication by opening an office adjoining the station and employing its own agent to deliver the messages. His decision would be to make the order granting leave to the municipalities upon such terms of compensation as might hereafter be determined.

Hon. M. E. Bernier concurred with many of Mr. Blair's conclusions. No doubt the contract was valid as between the two companies, but he did not see why the public should suffer because of such an agreement. He stated that railway stations and freight offices were erected for the benefit of the public and that they should have full access to them. Compensation would be considered later, although he did not see that the Railway Company was entitled to damages. Prof. Mills agreed that it was a matter of law, and therefore the opinion of the chief commissioner must be taken as decisive. He combatted the interpretation of the cases cited by Mr. Blair, and thought he had viewed them in the wrong light. Such exclusive privileges were not necessary nor reasonable and were against public interest. The decision was that an order granting permission for telephonic communication should ultimately issue.



IN THE OPERATING FIELD.

DRUGGISTS AND PHYSICIANS DISCONNECT BELL TELEPHONES IN KANSAS CITY.

SEVERAL months ago the Druggists' Association and a similar association of the physicians of Kansas City formally adopted the Home telephone for the use of the members and the Bell telephones in almost all instances were ordered out. At this stroke of success on the part of the Home Company the Bell people bethought themselves of some way to regain the patronage of the druggists and physicians. To have its telephones ordered out by some 215 druggists and many more physicians was a blow in itself, but the future effects, if other organizations of business and professional men followed this example, was of the most vital importance. The Bell Company has one kind of telephone service that as yet has not been adopted by the Home Company. This is known as the nickel-in-the-slot service. Upon this the Bell Company has a monopoly. It was obvious that by making this special service attractive to the druggists, competition could be had with the Home Company without a direct reduction of rates.

Following this plan, J. F. MacDonald, of Chicago, a prominent druggist of that city, came to Kansas City, as did also a Mr. Bodeman. Mr. Bodeman is a member of the Illinois State Board of Pharmacy and knows the Chicago situation thoroughly. He was the first speaker at a meeting of the Kansas City druggists, where representatives of both companies had opportunity to present their cases. He explained that the druggists in Chicago, instead of paying the rate of \$175 a year for telephones, which prevails in that city, had adopted the nickel-in-the-slot plan. This plan, he said, was universal, and the Bell Company would not put in any other kind in drug stores there. Under the Chicago system, according to Mr. Bodeman, a druggist was required to guarantee six calls a day, representing 30 cents revenue. Over and above the guaranteed 30 cents a day the druggist received 40 per cent. of the gross receipts of the nickel-in-the-slot boxes. On all long-distance calls originating in a drug store the druggist received 10 per cent. extra.

He said that by the nickel-in-the-slot arrangement the downtown drug stores of Chicago averaged an income of \$30 a month. He further explained that 75 per cent. of the Chicago druggists signed a petition for the nickel-in-the-slot telephones, and that then the Bell Company agreed not to put in any other kind. He did not say, however, that any other telephones were excluded from the Chicago stores.

Mr. Curtiss spoke for the Home Company, saying that by April 1st his company expected to have 6,000 telephones in operation with long distance connections with 150 towns. He said that so far as his company was concerned that if the druggists preferred nickel-in-the-slot machines they could have them.

At this point, Dr. C. M. Fulton, chairman of the committee on telephones of the Kansas City Academy of Medicine, who was present, made a little talk, saying that inasmuch as the physicians and druggists had already adopted the Home Telephone he hoped that the druggists would not now decide to make a change. "You stand by us and we will stand by you," was the keynote of Dr. Fulton's remarks. He said that nearly every one of the Bell telephones of the doctors would be out by April 1st, and that there would be scarcely one by June 1st.

Dr. Riddle, president of the association, got at the meat in the cocoanut by asking a few direct questions of the Bell representative.

"Would you make a contract with the druggist for any length of time on either of your propositions?"

"Yes, sir," replied the contracting agent.

"Gentlemen," continued Dr. Riddle, "on the proposition that you put in nickel-in-the-slot telephones and we would accept them on a 10 per cent. gross basis, isn't it reasonable to suppose that any druggist would use his telephone at least twelve times a day on an average? Now, at twelve times a day, at 5 cents a time, this would cost the druggist 60 cents a day or \$18 a month of 30 days. Of that amount I receive 10 per cent., or \$1.80 of my own money. That deducted from the original \$18 leaves \$16.20 clear money which I must pay the Bell Company per month. I will ask isn't it better for me to have a free telephone and pay the regular rate of \$8 a month, thus saving over one-half of the cost and at the same time giving my customers all the calls they need?"

To this proposition the Bell representative had nothing to say.

After the meeting, President Riddle, of the Druggists' Association, said: "It would be impossible for the executive committee to accept any proposition of the Bell Company. We will stay by the Home Company, for this is the only company that has given us relief and if it hadn't been for the Home Company the Bell Company would never have come to us with any sort of a proposition, but would have continued to snub us as it had done for years. I don't believe the druggists want nickel-in-the-slot telephones, but if they do the Home Company will furnish them. The Bell monopoly thought that by bringing these druggists to Kansas City from Chicago to tell us of the great advantages of the nickel-in-the-slot telephones we would stampede to the Bell Company, for it is generally known that the Home Company has no nickel-in-the-slot machines. But the Home Company called their bluff most beautifully by consenting to the nickel machines if we want them, which we don't. The telephone matter is settled and we will continue the Home service. The Bell Company waited too many years to come to our relief for us to go back on our friends now."

The druggists and physicians had written letters to the Bell Company ordering out their telephones April 1st, which was the end of the quarter, but for some reason these telephones were left in many of the stores and offices. The druggists claim that their determination to discontinue the Bell telephones will reduce the subscription list of the Bell Company by 3,000, this, of course, counting the physicians, as the two associations act together. Many physicians and druggists have taken matters into their own hands and disconnected their instruments where the monopoly refused to do so, as they were afraid that by some point of law the company might charge for another period of service if any calls were received.

MR. LATTIG RESIGNS AND IS GIVEN GIFT.

AT their offices, 112 North Broad street, Philadelphia, the employees of the United Telephone & Telegraph Company, as well as the officers of the York State Telephone Company, the officers of the Eastern Electrical Construction Company, and the officers of the Eastern Telephone Manufacturing Company, with whom he has held business relations, presented to the retiring General Superintendent, Mr. J. W. Lattig, a handsome dinner set of 150 pieces and a beautiful cut glass water set. Mr. Lattig has been with the United Telephone & Telegraph Company for two and one-half years, and during that time, as shown by the handsome gift, he has earned the good will and earnest co-operation of everybody, from the officers of the company down. Mr. Houck, the Traffic Manager, made the presentation. His presentation speech was as follows:

"I am honored by having been chosen by our associates in the company to express to you the regret we feel at the severance of your official relations with us and offer you a parting token of the high regard and esteem in which you are held not only as our head official, but also as a man whom it has been good to know. I regard it as a privilege to have been associated with you, and I feel when I say this that I voice the sentiments of every official and employee of the company from the office boy to the president, including those whose pleasure it has never been to meet you personally. You have proven yourself to be a man of high morals, kindly disposition, exceptional business ability and with remarkable powers of endurance, and you have undoubtedly placed this young company upon a foundation which promises for it a bright future. In a sense we have reached the parting of the ways, but it is our hope that social if not business relations will bring us together many times. I now have the pleasure of presenting to you this dinner set, and we believe that this gift is in accord with your predominating characteristic in that it will be serviceable to others. If the future can hold for you all that we wish, your life will be full of happiness and success."

Mr. Lattig responded as follows:

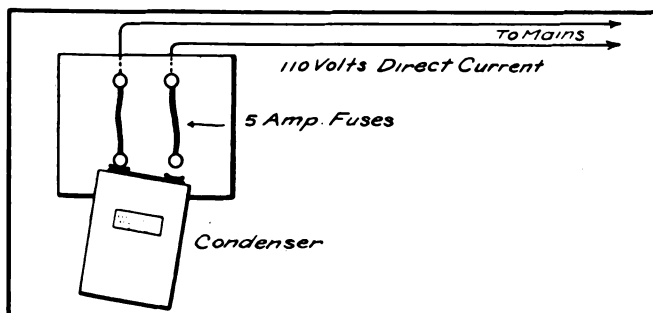
"Gentlemen, this most generous surprise has taken me so unexpected, that I cannot find words to express my gratitude. In fact, words can in no manner express my feeling. I wish to say that my success while with you has been due very largely to your loyal support, your good will and your hearty co-operation. I hope you will convey to all the employees my heartfelt affection. Gentlemen, you have simply taken my nerve and it is impossible for me to express my gratitude. Simply take my thanks. I wish for you a future of happiness and success."

Mr. Lattig's resignation as General Superintendent of this company goes into effect on April 1st, when he will begin new duties with the Delaware & Atlantic Telephone & Telegraph Company.

CLEARING SHORT CIRCUITED CONDENSERS.

By F. C. GREENWALD.

ON account of the wrappings of tin foil in a condenser necessarily being very close together, a mechanical shock or an electrical discharge sometimes causes the tin foil of one layer to come in contact with the adjacent layers. By applying a mechanical jar to the condenser sometimes the short circuit may



be cleared. Often, however, that method is unsuccessful and the condenser must either be sent to the factory or the following method used:

The condenser is placed across a 110 volt direct current circuit, as shown in the sketch. Care should be taken not to attach to an alternating current circuit, as alternating current will continue to flow through the condenser, even after trouble is cleared, possibly blowing the fuses and blinding the operator by the flash, or it may cause a spark sufficient to start a fire. When the direct current is applied, on account of the low resistance at the point of the fault, sufficient current will flow to burn away the tin foil causing the trouble. This will open the circuit. On attaching the condenser across electric light circuit a large, crackling flash will be noticed. On attaching the condenser a second time there will usually be no flash, indicating that the short circuit has been "flashed out." When flashing out a condenser it is well to always hold it at arm's length, so that in case there is an extremely large flash, the operator will not be burned or his eyes injured.

IOWA INDEPENDENT TOLL LINE MAP.

HENRY S. HERR, president of the Iowa Telephone Association, is compiling an Independent toll line map of the State of Iowa, which he wishes to be as near perfect as possible. He has succeeded in making arrangements with the publishers of the Iowa railway commissioners map to make a plate so that the telephone lines can be printed directly on the sectional

map of Iowa. It is essential to the success of Dr. Herr's project that all the Independent telephone operators in the State of Iowa render him assistance in giving him accurate maps of the lines under their jurisdiction. He is sending out county plates ruled in sectional lines of a good size to all the different telephone exchanges, asking them to assist him by drawing their telephone lines on the plates and returning them to him. He will do the rest and incorporate them into the composite map of the whole. If any of the Iowa managers do not happen to receive the blank plates, if they will write to Dr. Herr, he will consider it a favor and will be only too glad to send them.

LEGAL VICTORY FOR CINCINNATI INDEPENDENTS.

THE telephone companies that have been trying to get into Cincinnati, and have been unable to get a grant from the city for the use of the streets, have won a victory in the Probate Court. The companies concerned are the Cincinnati Telephone Company, the Queen City Company, the Fitzsimmons and the Interstate. They filed an application in the Probate Court asking for a franchise after the City Council had failed to grant what was asked of it. The city filed a motion in that tribunal asking that the defendants be compelled to make their petitions more definite and certain by stating specifically what streets they desired to use, and at what points on those streets they intended to set their poles. This was resisted on the ground that the statute under which the suit was filed in the Probate Court gave the right to use all the streets, and it was only the manner and mode of using them that the Court was authorized to determine.

TELEPHONE BILL INTRODUCED IN NEW YORK.

TO compel telephone companies to interchange calls is the object of a bill introduced in the Assembly at Albany, N. Y., by Mr. Cocks. The bill provides that it shall be the duty of every company, upon the request of a rival company and upon the delivery of a bond by the requesting company, to allow a switch connection so that a subscriber of one company may talk with the subscribers of another without extra charge. In case any company refuses such permission a writ of mandamus may issue and in case the bond required by the rival company is deemed excessive the writ may also fix the bond.

EXECUTIVE COMMITTEE MEETING OF MUNICIPAL ELECTRICIANS.

AT a meeting of the Executive Committee of the International Association of Municipal Electricians, held at Brooklyn, N. Y., April 2d, the following papers were selected and assigned, to be read at the ninth annual convention to be held at St. Louis, September 13-14, 1904:

"Street Lighting, Principles Involved and Systems Used," A. S. Hatch, Detroit, Mich.

"The Limitations of the Telephone for Fire Alarm Purposes," Adam Bosch, Newark, N. J.

"The Inspection of Theaters, from an Electrical Standpoint," Wm. H. Thompson, Richmond, Va.

"Methods of Testing," Walter M. Petty, Rutherford, N. J.

A TRAFFIC COMMITTEE MEETING.

AN important meeting of the traffic committee of the Independent Telephone Association, the members of which represent nearly all the long-distance Independent telephone companies in the country, was held at the Claypool, Indianapolis, on the 2d inst. The matter of formulating plans for the betterment of the long-distance Independent service was thoroughly discussed, and steps taken to build certain connecting links to make the chain of service complete. Arrangements were made to employ experts to prepare maps and plans necessary to the perfecting of the entire scheme. This committee was appointed at a recent meeting held in Indianapolis, and the reports made by the members is evidence that they have properly investigated the needs of the great system. Those in attendance and belonging to the committee were: J. G. Splane, Pittsburg; R. M. Foster, St. Louis; C. H. Ledlie, St. Louis; Fred S. Dickson, J. B. Hoge and B. W. Overly, Cleveland, and S. P. Sheerin and H. B. Sales, Indianapolis.

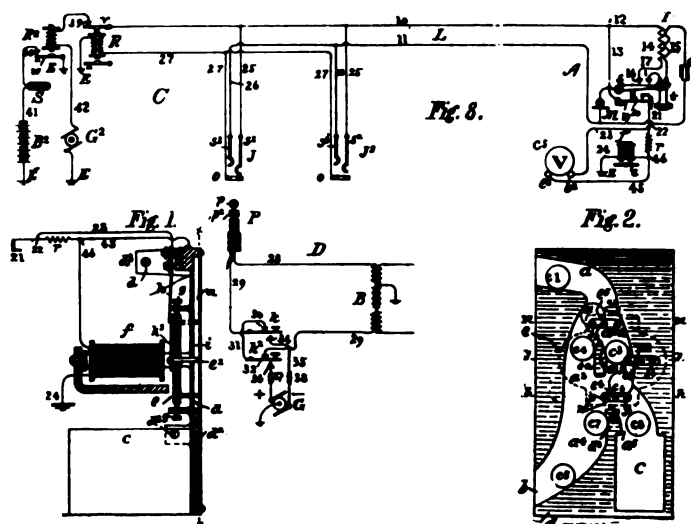
TELEPHONE



PATENTS

COIN BOX FOR PAY STATIONS.

S. J. Larned, Chicago, Ill., patents (No. 751,081) and assigns to the American Telephone and Telegraph Company, an improved apparatus for telephone pay stations. The object of this invention is to provide a coin collecting apparatus so arranged that if it is out of order the coin will be returned to the person calling, automatically, that if the operator cannot complete the connection she can return the coin voluntarily, or if the called party is obtained she can retain the coin. This invention is illustrated in Figs. 1, 2 and 8, in which Fig. 1 is a section through the coin box; Fig. 8 the circuit, while Fig. 2 is an elevation of the coin receiving mechanism. Essentially the apparatus consists of a peculiarly shaped slot into which

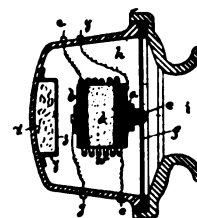


the coin is deposited. Behind the slot there is a polarized electromagnet whose armature carries a series of pins that project into the slot. The position of these pins terminates the direction which the coin travels and the position of the pins is determined by the current which the operator can send through the electromagnet. The apparatus is best understood by describing its operation. The first operation in the act of making a call is for the calling party to remove the receiver from the hook. Then calling party deposits the proper coin into the slot *a*. In the following description, the position of the coin, from time to time, will be referred to as *C'*, *C*₂, etc., and in Fig. 2, the coin positions are correspondingly illustrated by the circles which are similarly lettered. In Fig. 2 the controlling pins are specified by *e*₁, *e*₂ and *e*₃. When the coin is placed in the slot *a*, as indicated at *C'*, it rolls down until it strikes the pin *e*₃. If the electromagnet is unexcited the coin will be deflected to the left to the position *C*₂, *C*₄ and *C*₅, and will roll out of the slot at *b*, where it is captured by means of a box or receptacle, from which the calling person can recover the coin at pleasure. When the coin takes this route, it is to be understood that the apparatus is out of order, such as might result either from the failure of the calling party to remove the receiver, from a break in the line, or other contingency, which would prevent the operator from receiving a signal. This is a distinctive feature of the present patent. If, however, the apparatus is in working order, the removal of the receiver will cause the pin *e*₃ to be in the position *J'* because the armature of the magnet has been tilted by the current received when the receiver is removed. Then the coin will pass to the position *C*₁. Here it makes contact with the pins *e*₁ and *e*₂. Then the coin is a shunt to the signal circuit and as the coin is of low resistance, sufficient current passes to operate the line relay and lamp signal, thus calling the attention of the operator. When the operator inserts the plug,

the armature of the collector magnet returns to its middle position, the pin *e*₁ is in the center of the slot, obstructing it and causing pin *e*₂ to release the coin which rolls to the position indicated by *C*₆, and then the operator can talk to the subscriber. Key *K* is provided (see circuit *D*) whereby the operator can send either positive or negative current over the line and through the magnet *F* from the generator *G*. If the operator completes the connection, she sends positive current, moving the pin *e*₁ and allowing the coin to pass to position *C*₈ and thus drop to the coin box *C*. If, on the contrary, the connection is not completed, the operator sends negative current. This causes *e*₁ to move to the position *J*₆, obstructing the entrance to the cash box and causing the coin to roll to *C*₇, thence to *C*₅, where it is returned to the caller at *b*.

IMPROVED TRANSMITTER.

P. Germain, Fontenay Aux Roses, France, patents (No. 753,062) an improved telephone transmitter. This invention is shown in the figure and consists of a case, *h*, containing the diaphragm *f*,



to which the capsule *d* is attached. This is an ordinary microphonic capsule with the following exceptions: The granular carbon is impregnated with a solution of some salt of silver or other metal, which is subsequently reduced, thereby decreasing markedly the resistance of the carbon granules. The capsule is made of fire-proof material and surrounded with the helix *w*. When the transmitter is in use a strong current is passed through the helix which heats the capsule very hot. This, it is claimed, improves the power and efficiency of the transmitter.

PARTY LINE SYSTEM.

J. A. Gehrung, St. Louis, Mo., patents (No. 755,127) an improved party line system. This invention belongs to the class of party line systems which operate on different current strengths. The inventor provides four keys at the exchange, each one of which is connected to the signalling source of current through a different resistance. At each sub-station is a magnet adjusted to operate through a given resistance and thus different keys are enabled to select different stations.

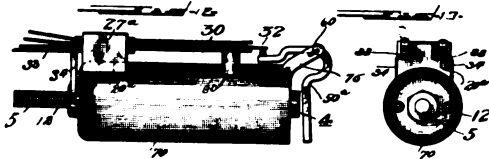
TELEPHONE RECEIVER SUPPORT.

H. L. Goodwin, Kansas City, Mo., patents (No. 754,556) an improved telephone receiver support and assigns to C. N. Lavery, Kansas City. This invention consists in a wire clip which is formed in such a manner as to enclose the stem of the receiver. This clip may be easily attached to the stem of a desk set or to the swinging arm of a transmitter, and thus a convenient support for the receiver is formed which obviates the necessity of laying the instrument down or letting it dangle from its cord.

IMPROVED RELAY.

A. Carliss, Chicago, Ill., patents (No. 752,613) an improved relay and assigns to the American Electric Telephone Company. The object of this invention is to provide an improved relay to be used particularly in switching work for cut-off or supervisory relays, the device being so arranged as to be cheaply manufactured, substantial, durable in character and reliable in operation. The relay is shown in the figures, from which it is seen that

there is a core 4, surrounded by an iron tube, 70, which consists of an insulating block. This block carries two sets of springs, 30, which are furnished with contacts, depending upon the nature of the circuit with which the relay is to work. An armature, 50a, is provided which is pivoted to the ears, 75, by means of the pin, 60. This armature co-operates with the spring, 32, so that when the relay is excited the lower contact is opened and the upper contact closed. Another feature of the invention is, substantially, the method devised for connecting the magnet winding with the



terminals to which the conductors are to be set. This is shown in Fig. 13. The winding of the core is brought out to the pin 12, which by means of the wire 34 is connected with the spring 33, to which the conductor is attached.

IMPROVED TELEPHONE.

M. C. Burt, Chicago, Ill., patents (No. 754,968) an improved form of telephone. This invention is for an improvement in magneto telephones, either for receivers or transmitters, and consists in building the magnet of a series of concentric steel cylinders, each one of which is wound with its appropriate exciting coil. By means of a switch one or more of these magnet cells can be cut into or out of circuit at pleasure.

ANTISEPTIC ATTACHMENT FOR TELEPHONES.

W. M. English and A. H. Ten Broeck, of San Francisco, Cal., patent (No. 754,057). This is a device for providing an antiseptic attachment for telephone systems. The inventors form some flexible conoidal shell which is secured in the mouthpiece of the transmitter by springing its edge over the rim of the transmitter funnel. This funnel is perforated and over it the proper antiseptic is sprayed.

TELEPHONE REPEATER.

I. Mitsee, Philadelphia, Pa., patents (No. 754,457) an improved telephone repeater. This invention consists in a coil of wire to which the incoming line is attached. In the center of the coil a galvanometer needle is balanced, which is attached to a rod that impinges upon a microphonic contact made of diluted sulphuric acid. This microphonic contact is attached to the outgoing line. Telephonic waves traversing the coil change the deflection of the galvanometer needle, thus varying the resistance of the microphonic contact and repeating the waves of the outgoing line.

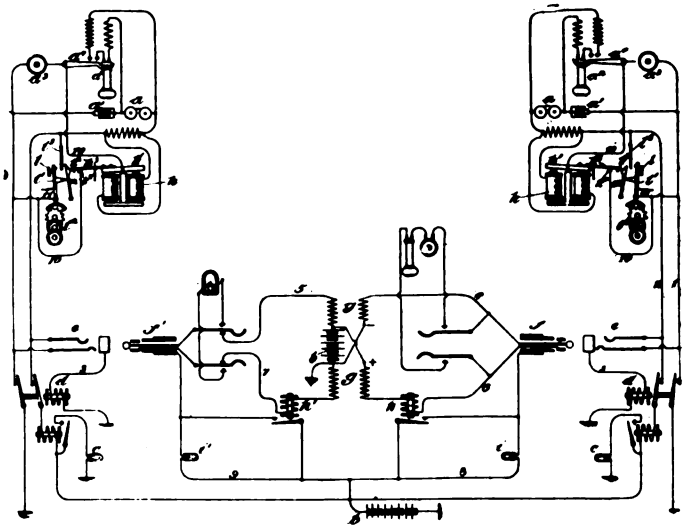
PARTY LINE SYSTEM.

T. W. Gleeson, of Boston, and R. Hamilton, of Milton, Mass., patent (No. 754,211) a party line system. This device belongs to the category of step-by-step party line systems. There is an electromagnet which operates an escapement. This escapement carries a commutator. All of the stations are equipped with the device, but different commutator segments are used for each station, and thus, by operating the electromagnet any particular station may be adjusted so that the station can be called.

SERVICE METER FOR TELEPHONE LINES.

C. E. Scribner, Chicago, Ill., and F. R. McBerty, Evanston, Ill., patent (No. 755,054) and assign to the Western Electric Company an improved service meter for telephone lines. This invention is a type of service meter which is similar to that of the previously described McBerty patent. From the accompanying figure it will be perceived that the sub-station is of the usual condenser common battery type to which the counting mechanism 1 is added. There is also a polarized electromagnet *k* which controls a shunt about the transmitter. At the central

office the circuit is of the usual common battery type, excepting that upon the connecting plug side of the cord the central office battery *b* is reversed in polarity from that given to the answering plug. The operation is as follows: When the operator observes a calling signal she inserts the answering plug *f* into jack *e* of the calling line, operating the cut-off relay and extinguishing the signal in the usual manner. The current from the battery *b* circulates in such a direction to the subscriber's station as to maintain the armature *k'*, as shown in the drawing, thus closing the short circuit 10 about the transmitter at *k4*. When the oper-



ator is ready to receive the order she addresses the usual inquiry, "Number, please?" The subscriber must then press the button 1 before replying. The subscriber is able to hear because the receiver is not shunted. The movement of the push button 1 operates the register and presses the lever *m* beneath the catch *k2*, opening the shunt about the transmitter and making the sub-station operative. Having received the instructions the operator makes the connection in the usual way. When the operator calls a line equipped with this form of service meter, she employs the calling plug *f'*, then the battery is reversed, the polarized relay *k* separates the switch contact *k3* and *k4*, thus breaking the shunt about the transmitter and leaving the sub-station set operative.

IMPROVED TELEPHONE TRANSMITTER.

J. A. Williams, Cleveland, Ohio, patents (No. 755,091) an improved telephone transmitter and assigns to the Williams Telephone Supply Company. This is an improved transmitter of the corn plaster variety. The essential features of the invention lie in a back electrode which is made of a piece of stamped sheet metal so formed as to retain the circular ring of felt that forms an enclosure for the carbon granules. This sheet metal is also provided with a sharp tit in the center, which impinges in a screw set in the bridge, thus making a kind of a universal joint for the carbon cell.

TELEPHONE CALL REGISTER.

J. H. Meyer, of Magdeburg, Germany, patents (No. 755,515) an improved telephone call register. This apparatus registers the number of calls made at the sub-station and operates upon the same principles as those of the Scribner and McBerty patents. But Mr. Meyer's apparatus is not automatic, and it is necessary for the operator, by means of a peculiar key, to work the apparatus at the sub-station.

TELEPHONE REPEATER.

S. P. Levenberg, New York, N. Y. patents (No. 754,224) an improved telephone repeater. In this device the inventor employs a magneto telephone to actuate the diaphragm, which in connection with the microphone is expected to repeat the voice currents in one circuit into the line of another circuit.



THE WEEK'S MESSAGES

FINANCIAL

CHAMPAIGN, ILL.—The Grangers' Mutual Telephone Company, of Champaign, will decrease its capital stock by \$2,000.

CLINTON, IA.—The Tri-State Telephone Company has increased its capital stock to \$600,000.

VINTON, IA.—The Farmers Mutual Telephone Company has amended its articles of incorporation so as to increase its capital stock from \$2,000 to \$10,000, and a number of shares of stock from \$4,000 to \$20,000. The directors are: J. B. F. Bunton, A. A. King, J. M. Beatty, R. S. Harper, George King, M. E. Whipple, and John Lorenz.

BEDFORD, MICH.—The Calhoun County Telephone Company has increased its capital stock from \$150,000 to \$250,000.

AMSTERDAM, N. Y.—The Amsterdam Automatic Telephone Company will increase its capital stock and install a switchboard and make other improvements.

PHILADELPHIA, PA.—The Keystone Telephone Company since the first of the year has installed new telephones to the number of 1,200. The statement is made by an official that the net earnings for the first quarter of the present year will surpass largely those of the corresponding period last year, when the profits were \$41,000.

PHILADELPHIA, PA.—It is announced that the Keystone Telephone Company, as soon as the market conditions permit, will ask authorization to issue \$5,000,000 bonds, of which \$1,500,000 will be sold at once.

ROCKINGHAM, VA.—The Rockingham Mutual Telephone Company has increased its capital stock to \$25,000.

FRANCHISES.

OAKLAND, IND.—The Ohio Valley Home Telephone Company has been granted a local franchise.

LODIBURG, KY.—The Lodiburg & Webster Telephone Company has been organized, with Jesse Payne, treasurer, and James St. Clair, president.

COLDWATER, MICH.—T. A. Hilton has asked for a franchise for a local system.

PITTSBURG, PA.—The Pittsburg & Allegheny Telephone Company will ask for a franchise to install a system at Glassport.

EL PASO, TEXAS.—Mess. Dean, Bowden and Bryan, representing the Southern Independent Telephone Company, have asked the city council for a local franchise.

HILLSBORO, TEX.—The City Council has voted to grant a new franchise to the Independent Telephone Company.

COMBINATIONS

MARLOW, IND. TER.—The Fort Pitt, Oklahoma & Texas Telephone Company of this place has sold out to the Texas Telephone Company, which has headquarters at Wichita Falls, Texas.

FARRAGUT, IA.—Citizens of this place have purchased the Tabor telephone lines in this territory and will organize a company.

HOMER, MICH.—The Home Telephone Company has purchased the telephone line from here to Tekonsha. The Citizens' Telephone Company of Grand Rapids is constructing a new line from here to Tekonsha, Burlington, Union City to Grand Rapids.

ESTHERVILLE, MINN.—The Western Electric Telephone Company of Sioux Falls has changed its headquarters to this city.

HALSTAD, MINN.—The Halstad Telephone Company has leased from the Hillsboro-Duane-Caledonia and Shelly Telephone Company, the latter's lines on the Minnesota side of the Red River. A switchboard will be installed here and also at Shelly.

CAPE VINCENT, N. Y.—John H. Grapotte has purchased the telephone line in this village and will style it the Cape Vincent Telephone Company.

PRAIRIE DEPOT, OHIO.—Fred Windisch has purchased the local telephone exchange and will remodel it and put it in good condition.

TOLEDO, OHIO.—The Wood County Telephone Company, with headquarters at Bowling Green, has been sold to a company headed by H. A. Ashbrook, D. A. Yoder and J. S. Yoder, of this city. The company has a capital stock of \$2,000, and has a switchboard for a capacity of nine hundred subscribers. It is the intention to reconstruct the entire system.

HONESDALE, PA.—The Citizens' Telephone Company has been purchased by the Honesdale Telephone Company. The principal office of the Honesdale Company will be in Scranton.

ELECTIONS

SARATOGA, CAL.—The Saratoga Mutual Telephone Company has elected Ralph A. Husted, president; James P. Richards, secretary; Dr. R. L. Hogg, treasurer; J. M. Lipscomb and W. B. Tomlinson, directors.

IANNA CITY, ILL.—The Cherry Fork Telephone Company at a meeting held here, elected the following officers: H. B. Pinkerton, president; Dan Larkin, vice-president; W. H. Gardiner, secretary; William Glasgow, treasurer.

STENDAL, IND.—The Stendal Home Telephone Company has elected Fred Schmickler, president; Frank Jones, vice-president.

DES MOINES, IA.—The Mutual Telephone Company has elected the following officers: J. S. Bellamy, of Knoxville, president; J. W. Hill, Des Moines, vice-president; J. C. Hume, Des Moines, secretary; L. M. Grimes, Des Moines, treasurer; J. S. Bellamy, Knoxville; C. E. Bronson, Dallas

Center; L. M. Grimes, Des Moines; O. C. Herrman, Boone; J. W. Hill, J. C. Hume and M. McFarlin, all of Des Moines, directors.

AUDUBON, IA.—The Audubon County Telephone Company has elected W. B. Swaney, president; William Masterson, of Exira, vice-president; L. E. Simpson, secretary and treasurer; W. B. Swaney, of Audubon; B. F. Simpson, of Brayton; William Masterson, of Exira; Dr. I. R. Williams, or Manning, and L. E. Simpson, of Audubon, directors.

RED OAK, IOWA.—The Montgomery Telephone Company has elected S. G. Hersman, president; C. H. Brown, vice-president; C. F. Clark, treasurer, and J. F. Miller, manager and secretary.

SPRINGPORT, MICH.—The Springport Mutual Telephone Company has elected Andy Courtright president; Oscar Baker, secretary; Lil Carter, treasurer, and Will Cooper, manager.

NEW HOPE, OHIO.—Telephone Company No. 11 has elected the following officers: L. B. Porter, president; Edward Dindore, secretary; Christian Boyer, treasurer.

LA CROSSE, WIS.—At the annual meeting of the Inter-State Telephone Company, held here, the following officers were elected: James A. Tawney, president; John Dietze, vice-president; Otto Troost, Jr., secretary and treasurer; James A. Tawney, John Dietze, E. K. Tarbell, Edward Lees and J. R. Mitchell, directors.

PERSONAL

W. C. DILLON who has been superintendent of the People's Home Telephone Company of Birmingham, Ala., has resigned and will accept the same position with the Memphis Telephone Company, of Memphis, Tenn.

U. G. TOWNSEND, formerly with the Bryan Telephone Company, Bryan, Ohio, has accepted a position with the Williams-Abbott Electric Company, of Cleveland, Ohio, as salesman for their line. His address is 8, 10 and 12 Columbus street, Cleveland, Ohio, which is the office of the Williams-Abbott Company.

F. H. WHEELER, who was recently associated with the Imperial Finance & Construction Company of Toledo, Ohio, as chief engineer, has again entered the construction field under the name of the Wheeler Electric & Construction Company, with offices at 305 Dearborn street, Chicago.

MISCELLANEOUS

UTICA, N. Y.—The Utica Home Telephone Company has opened its branch exchange at Whitesboro, four miles west of Utica. The switchboard has about 125 telephones at present, but this number will be doubled before the end of a month.

MARSHALLVILLE, OHIO.—The Marshallville Telephone Company has changed its name to the Marshallville-Rittman Telephone Company.

UNDERGROUND

ST. LOUIS, MO.—The Bell Telephone Company of Missouri will increase its capital stock to provide funds for the removal of overhead wires in St. Louis.

SOMERVILLE, N. J.—The New York and New Jersey Telephone Company is planning the construction of underground conduits.

CONSTRUCTION

RED BLUFF, CAL.—Citizens of this place, on account of the raise in rates of the Bell Telephone Company, are arranging to organize a company and construct a local exchange.

AKRON, COLO.—J. C. McPhearson, president, and N. D. Beaver, general manager of the telephone company, are arranging for an extension of the line for through connections east and west of Akron.

HEBRON, ILL.—Farmers in this neighborhood have planned a system with about two hundred telephones. They will absorb the village exchange connecting with several other villages.

VERMILLION, ILL.—The former stockholders of the Citizens' Telephone Company have decided to construct a line from here to Denison.

CAMDEN, IND.—The Carroll County Telephone Association, at a meeting held here recently, practically decided to install a switchboard in Flora.

CHALMERS, IND.—Arrangements are being made to establish a co-operative telephone system at this place.

VEVAY, IND.—Citizens of this place are endeavoring to organize a mutual telephone exchange company for the construction of a local system.

ELDORA, IA.—The Mutual Telephone exchange has installed a new switchboard.

EXIRA, IA.—The Farmers' Mutual Telephone Company will extend a line to Audubon.

FAIR VIEW, IA.—Farmers of Fair View have decided to put in an Independent telephone line.

SLOAN, IA.—A rural telephone company is planned here.

SCOTTSVILLE, KY.—Citizens of this place have decided to construct an Independent telephone exchange.

HANTH, MASS.—It is expected that the Hanth Telephone Company will extend its lines to Ashville.

HARDWICK, MASS.—The Farmers' Suburban Telephone Line is arranging for the construction of its system.

CAMBRIA, MICH.—The Cambria and Reading Telephone Company is arranging for the construction of its system. Exchanges will be maintained at Reading and Cambria.

SAGINAW, MICH.—The Valley Telephone Company will install an exchange at Cairo at once.

ARLINGTON, MINN.—Farmers' and Merchants' Telephone Company will establish a telephone exchange here. It is the intention to build party lines to Green Isle, New Auburn and other places.

HENDERSON, MINN.—The Henderson Telephone Company will install a number of lines from this city into the farming districts.

KNAPP, MINN.—The Knapp Telephone Company is arranging for the installation of a switchboard in Cokato.

HAMMONDSPORT, N. Y.—Fred Ovenshire is arranging to extend his telephone line from the Walcott Church to Sonora, where a switchboard will be installed, and from there to Mount Washington and Irish Hill.

FAYETTEVILLE, N. C.—The Carolina Telephone and Telegraph Company is arranging for the improvement of its service.

HENDERSONVILLE, N. C.—Citizens of this place have revolted against the high rates of the Bell Telephone Company, and are planning the organization of a company to construct an independent system.

RICHMOND, OHIO.—The Richmond Home Telephone Company and the Greenville and Eaton Telephone companies are planning the joint construction of long distance lines.

CORVALLIS, ORE.—L. H. Davis, E. McLannan, J. R. Smith and others are arranging for the organization of a Farmers' Telephone Company for this city.

KEYSER, W. VA.—G. P. and H. W. Miller, who are constructing a first-class telephone line from Martinsburg to Cumberland, have entered into a contract with the Levels Telephone Company to reconstruct the latter's line between Levels and Romney.

ALLENTOWN, PA.—The Ironton Railroad will do away with the telegraph system along its lines and the Lehigh Telephone Company will install the telephone system. Many railroads in the West are adopting telephones along their lines instead of the telegraph. Experiments have resulted in the placing on every train on some western lines of telephones with easily applied connections. Should a breakdown occur anywhere on the road the intelligence can be communicated by making connections with the telephone apparatus and the overhead wires which parallel the track. The necessity of reaching a telegraph station and finding an operator is thus obviated and the saving of time and lives perhaps becomes very great.

BEDFORD, PA.—The Bedford-Fulton Telephone Company is arranging for the extension of its lines to Hopewell.

MENNO, S. DAK.—Arrangements are being made for the completion of two rural telephone lines, one from Wittenberg to Menno, and the other from Wittenberg to Scotland.

SILVER CREEK, WASH.—The Home Telephone Company of Silver Creek is arranging the construction of a line from Mossy Rock to Shehalis.

SPOKANE, WASH.—J. A. Hanson of Davenport is endeavoring to construct a Farmers' Telephone Company, running out from Spokane.

BARRE, N. D.—The farmers of this place are planning the construction of rural telephone lines.

PEMBINA, N. D.—Residents in the vicinity of McArthur have decided to construct a private telephone line from there to Pembina.

WHEELING, W. VA.—The work, which has been in progress for a long time on the connection of independent telephone lines between this city and Wellsburg has been completed. By connecting with the Wellsburg company's line, the National now reaches the following named cities and towns for the first time: Wellsburg, Bethany, Lazearville, in this State; Brilliant, Mingo, Steubenville, Wellsville, East Liverpool, and Alliance, in Ohio; and Independence, West Middletown, Patterson, Buffalo, Burgettstown, McDonald, Oakdale and Carnegie in Pennsylvania.

BARRON, WIS.—The Barron County Telephone Company is planning extensive improvements on its lines and exchanges throughout the country, and is also considering the construction of several farmers' lines.

FRANKSVILLE, WIS.—The stockholders of the Franksville and Thomsonville Telephone Line are considering the extension of a line east from Franksville.

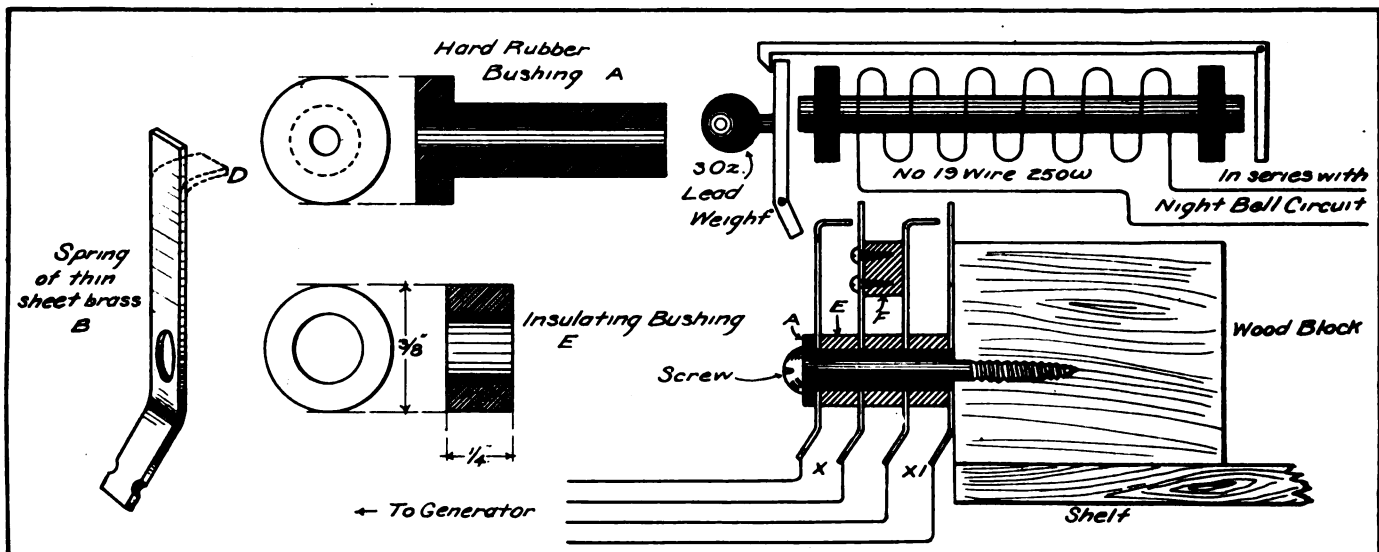
PECKETT, WIS.—Citizens of this place are planning to construct a telephone line from this place to Ring.

CONSTRUCTION OF A CIRCUIT CLOSER

By C. S. BUNDESMAN.

FOR the benefit of those who desire to construct a circuit closer such as that used with the automatic Pole Changer Starter described in a recent issue of THE AMERICAN TELEPHONE JOURNAL, the following description is given. Secure a thin sheet of brass or other suitable metal and cut it into strips about $\frac{1}{2}$ an

inch wide. About $\frac{1}{2}$ an inch from the bottom and in the center drill a $\frac{1}{4}$ -inch hole in each of the four pieces, as at B. The rubber bushing A should be of the following dimensions: 1 1-16 inch in length, $\frac{1}{4}$ inch outside diameter, $\frac{1}{8}$ inch inside diameter. Insert the bushing into the first spring, which should be slightly bent over at its top as at D. Then take a bushing like E, slip this over the bushing A. Then the second spring, to which previously a rubber block has been screwed, as represented at F, is mounted. When all has been mounted secure them by passing a long wood screw through into the wood block. The circuit closer, which can be made from an old drop, is mounted on this block and is permitted to extend over the edge sufficiently to allow the shutter when fallen to be at right angles to the springs, and so at the same time it will close the contacts. The circuit closer is energized by the switchboard drop falling and closing the night bell circuit,



inch wide. About $\frac{1}{2}$ an inch from the bottom and in the center drill a $\frac{1}{4}$ -inch hole in each of the four pieces, as at B. The rubber bushing A should be of the following dimensions: 1 1-16 inch in length, $\frac{1}{4}$ inch outside diameter, $\frac{1}{8}$ inch inside diameter. Insert the bushing into the first spring, which should be slightly bent over at its top as at D. Then take a bushing like E, slip this over the bushing A. Then the second spring, to which previously a rubber block has been screwed, as represented at F, is mounted. When all has been mounted secure them by passing a long wood screw through into the wood block. The circuit closer, which can be made from an old drop, is mounted on this block and is permitted to extend over the edge sufficiently to allow the shutter when fallen to be at right angles to the springs, and so at the same time it will close the contacts. The circuit closer is energized by the switchboard drop falling and closing the night bell circuit,

which causes the circuit closer shutter to fall and close the contacts. The weight of the shutter, together with the added lead weight, is sufficient to cause the spring to close the circuits. The replacing of the shutter opens all circuits to normal. In mounting the relay and block the building of a separate shelf only large

NEW YORK CENTRAL HAS TELEPHONE WIRE FROM NEW YORK TO CHICAGO.

THE New York Central Railroad Company is stringing a telephone wire from Chicago to New York. It is a No. 8 copper wire, and although the cost will be great the company thinks that the installation will pay. The wire has been strung from Chicago to a point east of Syracuse, and it is expected that it will be completed to New York within six weeks. Its terminals will be the Grand Central Station in New York and the Lake Shore Station, Chicago.

BOOK NOTICES

Any book herein reviewed will be sent postpaid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

COMPENDIUM OF DRAWING: Published by the American School of Correspondence. 2 vols., 900 pages, 1,000 illustrations. Price \$3 per vol., or \$5 per set.

This is a collection of the instruction papers on drawing as given in the various technical courses of this institution. The work is divided into two parts, the first volume treating of the architectural or artistic branch of drawing, the second dealing with the mechanical or practical side. The first three papers are on the general subject of mechanical drawing, beginning with a description of materials used in drawing, and containing articles on the use of instruments, and on their application to geometrical problems, projection, intersection and developments.

The next paper contains a fairly complete treatment of the principles of shades and shadows, together with problems illustrating their application. Following this there are very good articles on the subjects of perspective and rendering which should be of great value to those engaged in architectural work. The final paper of this volume is devoted to architectural lettering.

Vol. II., as stated above, deals with the practical end of drawing. It includes the subjects of mechanical drawing, machine design, mechanism and sheet metal work. The sections devoted to mechanical drawing are well handled and contain much valuable material. A feature of one of these sections is a complete set of drawings for a duplex pump, beginning with the preliminary layout, proceeding through the drawing of details and finishing with an assembly. Considerable space is given to the subject of mechanism, which is treated in a simple and easily understood manner.

The paper on machine design appears to the writer to be especially worthy of notice. It begins with a general consideration of the subject in which many useful hints as to the proper method of procedure are given. The complete design of a specific machine is then carried out. This should be of considerable value to the young designer as it shows in the clearest possible manner the many problems to be solved even in the design of the simplest machine. The book ends with papers on sheet metal work, which treat the subject in a very practical and thorough manner. A number of tables useful to the sheet metal worker are included in this section.

The principal fault of the work is the lack of system in the arrangement of the material. For instance, the subject of mechanical drawing appears in several different places and some of the matter included in mechanical drawing might with advantage be placed under the head of mechanism. However as the papers were not designed in the beginning to be published in this form and as the arrangement does not interfere materially with the usefulness of the work, this drawback may be overlooked. The Compendium of Drawing is intended to be a survey of the general field of drawing and it serves its purpose creditably.

Those who are engaged or interested in any branch of drawing should be familiar with other branches also and to all such the work is recommended.

TRADE NOTES

G. M. GEST, the expert subway contractor, of New York and Cincinnati, has just been awarded a contract by the Bell Telephone Company, of Cincinnati, O., for installation of a large conduit system through Cumminsville, one of the outlying districts of Cincinnati. Work is to be started immediately.

THE S. H. COUCH COMPANY, of 162 Pearl street, Boston, Mass., has just issued Illustrated Price List B. The above company is desirous that exchange managers, contractors and supply dealers should have a copy of this list, and will promptly mail a copy upon receipt of a card requesting it.

THE TELEPHONE PRINTING COMPANY, of Defiance, Ohio, has issued a brief circular which describes a novel enterprise, namely, the design and publication of blanks for the purpose of transacting telephone business of all de-

scriptions. Forms are printed and supplied for all departments of telephone and toll accounting.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, of Chicago, has recently closed contracts with the following named telephone organizations for their complete equipment, ranging in capacity from 100 to 500: Guide Rock Telephone Co., Guide Rock, Neb.; Farmers Mut. Co., Columbia City, Ind.; Denver Co-operative Co., Denver, Ind.; Farmers Co., Union Hill, Ill.; Boynton Co., Berlin, Ill.; Maurice Co., Maurice, Ia.; Liberty Center Co., Liberty Center, Ind.; W. D. Hunt Co., Oak Grove, Mo.; Mexico Home Co., Mexico, Ind.; Mt. Zion Co., Mt. Zion, Ind.; Holstein Co., Holstein, Neb.; Conway Rural Co., Conway, Kan.; Pekin Co., Pekin, Kan.; Farmers Co., Galena, Kan.; Burkey-Calhoun Co., Ashland, O.; Norwalk Co., Norwalk, Ia.; Farmers Co., Amity, Ore.; Allyn Yocum Co., Sheridan, Ore.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Rochester, N. Y., and Chicago, Ill., has just issued an exceedingly attractive and artistic reminder in the shape of a calendar. This souvenir consists in a large piece of embossed board, in the right hand corner of which an American Beauty rose appears. On the other side is mounted a genuine matt surfaced photographic print of a young lady in the act of using the telephone. To attempt a description of an American Beauty rose would be superfluous, and the authors of the calendar have certainly succeeded in selecting from their garden of girls a flower which far outrivals even the queen of the rose tree. In the lower left hand corner, a small calendar appears. The Stromberg-Carlson Company will forward one copy of this artistic production to the heads of operating companies on receipt of five two-cent stamps, which is sufficient only to cover the necessary postage.

THE STANDARD VITRIFIED CONDUIT COMPANY, of 39-41 Cortlandt street, New York, has completed its plant at South River, N. J., and its perfect equipment. Owing to the great demand for conduit manufactured by this company, its plant has run continuously since it started in 1902. In this time an enviable reputation has been gained by it on account of its promptness in delivery of a strictly high grade material. Under patents of Mr. R. W. Lyle, the company is manufacturing multiple duct conduit. It also furnishes free to its customers its own patented mandrel for laying single duct, which yields great economy in construction. Ample stock of both standard and special sizes, together with fittings, are kept on hand for short notice delivery. Forty million feet of conduit annually can be produced by its factories. Among the largest buyers of the Standard Vitrified Conduit are: the Bell Telephone Co., New York, Boston and Southern States; Rapid Transit Subway Const. Co. (New York Tunnel), Manhattan Elevated, Met. St. Ry. Co., Consolidated Tel. & Elec. Subway Co., New York Edison Co., Brooklyn Edison Co., Brooklyn Rapid Transit Co., Boston Elevated Railway Co., the Philadelphia Edison Co., the Philadelphia Rapid Transit Co., New York Tunnel Co., Westinghouse, Church, Kerr & Co., United Engineering & Const. Co., Western Electric Co., Standard Underground Cable Co., Safety Insulated Wire & Cable Co., Pennsylvania Railroad Co., Baltimore & Ohio R. R. Co., New York Continental Jewell Filtration Co., Hudson River Water Power Co., Glens Falls, N. Y., Niagara Falls Power Co. Material can be shipped by rail or water. Send for its new illustrated catalogue, which is a work of art.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

\$AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. **AMERICAN TELEPHONE JOURNAL** knows we are O. K. Send for samples. **GILDART BROTHERS**, Albion, Mich. 131

POSITION—Competent telephone man desires position. Seven years' experience in both inside and outside work. Thoroughly understands Common Battery and Magneto Systems. Best of references. Address Box 154, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 154

POSITION—Energetic technically educated young telephone man desires managership of exchange of about 500 subscribers. Can operate economically and please subscribers. Will be at liberty May 1st. Can arrange to go to any good opening. Address, Box 160, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 160

POSITION—Wanted as wire chief or switchboard man. Nine years' experience. Good references. Address Box 158, **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 158

WANTED—Position by a man with eight years' experience on subway work, either as superintendent or general foreman. Excellent references. Address Box 159, care of **THE AMERICAN TELEPHONE JOURNAL**, 116 Nassau street, New York City. 159

OUR BUSINESS DEPENDS

on giving you good Poles and shipping them Promptly.

That means a good deal when it's carried out to the letter.

A word from you will bring a full explanation of our exceptional ability to fill orders.

May we not hear from you?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Empire Building.

"From the Stump to the Line"

PITTSBURG & LAKE SUPERIOR IRON CO. ESCANABA MICHIGAN

PRODUCERS AND WHOLESALERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building, **CHICAGO, ILL.**

Cedar Poles

Large Stock

Prompt Ship-

ment.



LONG

POLES

A

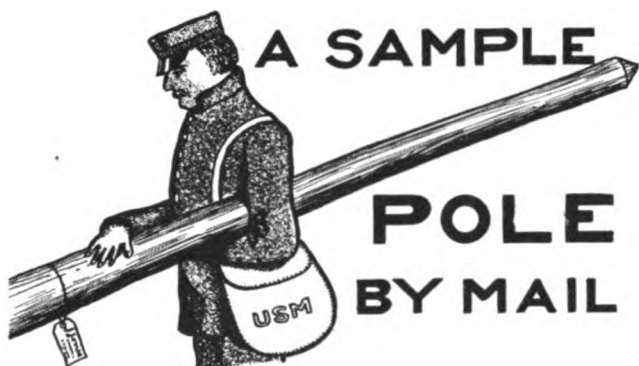
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



is hardly possible, we admit.
But why not try a

SAMPLE CARLOAD
of our

POLES
BY RAIL

Our Prices are attractive and we can make prompt shipments.

SAND POINT CEDAR CO.
SAND POINT, IDAHO.

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

**CEDAR
POLES**

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**



INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM



A SPRING BINDING POST.

Protected by Patent.

Grips the wire without the use of a screw. Grips any size wire that can be put into it and holds it so firmly that a loose contact is impossible. Wire can be put in or taken out in one-tenth the time it takes to adjust a screw post and there is no possibility of the wire being broken off in the operation.

Just the thing for wire connections that have to be changed often because of the ease with which it can be done, and just the thing for wire connections that are to be permanent because of the surety of the contact.

The wire can not jar loose.

Contractors should demand this post on their electric bells and annunciators. It will insure their reputation for permanent work and save lots of complaints. Ask to have your dry batteries equipped with it and notice how easily they are connected up—and stay connected. Just the thing for automobile batteries.

It is cheaper than any good screw post on the market and can take the place of an expensive one. Write to us about it.

THE FAHNESTOCK TRANSMITTER CO., 74 Cortlandt St., N. Y. City
SWAZEY & SMITH, 53 State St., Boston, Mass., New England Selling Agents

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

TRIPARTITE STEEL POLE

"It Never Wears Out."

Six Reasons for Using Tripartite Steel Poles

1st, Tripartite Steel Poles weigh less than any other pole (wood or steel); there is, therefore, a large saving in freight charges, at least 50 per cent.

2nd, Tripartite Poles require a set of only 1/10 of their entire length as against a 6 ft. set on all other poles; this is on account of the positive anchorage we secure.

3rd, There is no time wasted in trimming a Tripartite Pole. When it is delivered it is ready to erect. It is painted thoroughly before leaving the Mill. Caps, clamps for holding cross arms, etc., are furnished.

4th, We furnish Poles for the service required according to your specifications; you get just the Pole you want, and do not pay for a lot of material you do not need. Our expert knows all about strains, and will tell you what you need for your work.

5th, Tripartite Poles are stronger and more elastic than others, being made from High Carbon Steel, they will NOT "scale rust," nor will they take a permanent "set" when overloaded by snow or sleet.

6th, The "life" of a Tripartite Pole when properly cared for, i. e., painted every two or three years, is unlimited; it will last a lifetime.

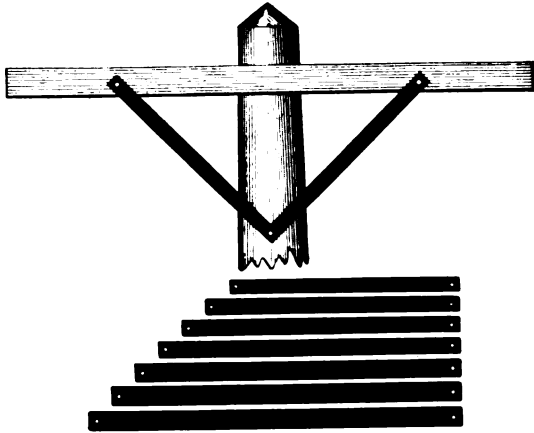
AND THERE ARE MANY OTHERS

THE FRANKLIN ROLLING MILL AND FOUNDRY CO.

FRANKLIN, PA.

New York Office, 253 Broadway. Chicago Office, McClernan & Orr, Monadnock Block.

Cable Address, "Chasmackey."



CROSS ARM BRACES

PLAIN JAPANNED GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

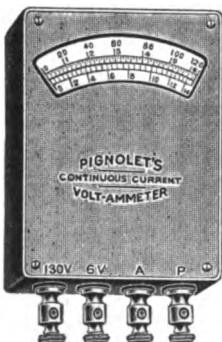
INDIAN

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

CEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you.

Orders filled at once; no delays, no "casing." TRANSPPOSITION PINS, etc. a specialty.

ELKIN MACHINE CO.
ELKIN, N. C.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. OHUROHILL
HERON, MONT.

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

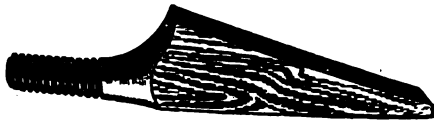
Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND

A Salesman

costs you lots of money. He covers a limited territory only.

An Ad

doesn't cost much, and covers the whole territory. Write for prices.

We Make
a Specialty
of
Telephone
Poles.

P
O
L
E
S

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

P
O
L
E
S

FRANCIS
BEIDLER
& CO.
459-519 W 22d St.
CHICAGO, ILL.

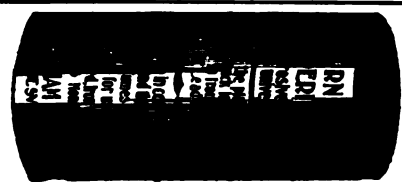
Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♣ ♣ ♣

Toll Tickets	Receipts for Toll Service
Toll Station Journals	Receipts for Exchange Service
Toll Station Lodgers	Lease Records
Monthly Check Reports	Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



Do you always mention the


American
Telephone
Journal

when writing to advertisers?
It will be appreciated by all
concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

R. R. AKERS, Manager.
LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.
167 Dearborn St.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
ELECTRICAL ENGINEER
AND CONTRACTOR " " "
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.

**Burlington
Route**

P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

Keeling & Ridge Co.
General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL, \$250,000.00.
Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,
ENGINEERS
CONTRACTORS

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

WESTON STANDARD
DIRECT READING PORTABLE

Voltmeters, Ammeters, Millivoltmeters, Voltmeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

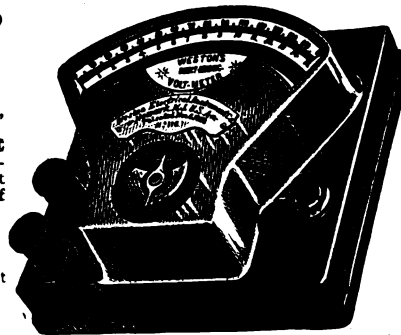
Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 38.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadiot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

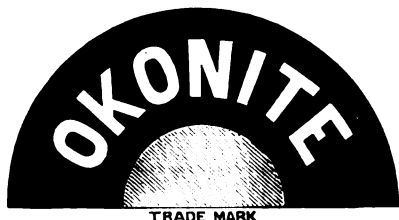
Linemen's Outfits
Construction Tools

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



TRADE MARK.

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

Sole Manufacturers **THE OKONITE CO., Ltd.** 253 Broadway, N.Y.

WILLARD L. CANDEE, } Managers
H. DURANT CHEEVER }

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION
NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

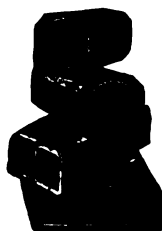
Name _____
Street Address _____
Town _____ State _____

American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.
4-19

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.
39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.
High Grade Material.
Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

An Ad

in a weekly paper reminds the purchaser fifty-
two times a year; in a monthly paper, but
twelve times.

16 to 1

is a dead issue, but

52 to 12

is not. It is our issue.

Dickey Conduits

VITRIFIED CLAY
SALT GLAZED

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.
Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,
KANSAS CITY, MO.

PATENTED CONDUIT



For Electric Wires and Cables

This Casing is Wrought Iron with clamp or sleeve joint. Is somewhat
lighter and more convenient to handle than Steam Pipe, and at much
less cost.

We furnish this Casing in random lengths, ranging from ten to sixteen
feet long. Tarr'd by Dr. Angus Smith's patent process.

This Casing is universally adopted by all the principal Telephone and
Electric Light Companies in the United States.

PRICES MADE UPON APPLICATION

CUNNINGHAM IRON COMPANY

Summer, B and Fargo Sts., BOSTON, MASS.

McINTIRE'S
(Patent)
CONNECTORS
AND
TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

BITUMINIZED FIBER CONDUIT

FOR ELECTRICAL UNDERGROUND CONSTRUCTION
ELECTROLYSIS PROOF :: WATER PROOF

A smooth laminated insulator of unchanging durability.

Forms a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. There has never been a gas explosion in our conduits, nor the slightest evidence of electrolysis.

Abrasion of the cables is an impossibility.

It saves sixty per centum of freight and handling cost, and twenty to thirty-five per centum of construction.

Prompt Deliveries.

Process of laying is simple, rapid and inexpensive. There is no loss from breakage or fitting.

It is self-aligning and cannot settle out of alignment.

All sizes, from one inch to ten inches interior diameter. Bends of all angles.

The foremost electrical engineers are recognizing and testifying to the scientific advantages of our system of subway construction over all previous methods.

Send for illustrated book. Ask for prices, giving size and quantities required.

AMERICAN CONDUIT COMPANY, 7th Floor, 170 Broadway, N. Y.

336 Macy St., Los Angeles, California. Manhattan Bldg., Chicago

Factories: PHILADELPHIA, CHICAGO, LOS ANGELES

ADVERTISERS' DIRECTORY—Concluded

POWER PLANTS.
Holtzer-Cabot Elec. Co., Brookline, Mass.

PROTECTORS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.
Chicago, Burlington & Quincy Ry. Co.

SEALS.
Middleton & Co., J. W., Chicago, Ill.

SIGNS.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

SOLDER, RESIN CORE.
Kellogg Switchboard & Supply Co., Chicago, Ill.

STATIONERY.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.
Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.

Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Electric Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BLANKS.
Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.
Yeshera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Elec. Co., Brookline, Mass.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yeshera Mfg. Co., Toledo, O.

TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., Co. Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebing's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburgh, Pa.



Experience
is a wise teacher
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

4 MOST

4 EVER

Leich

4

Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

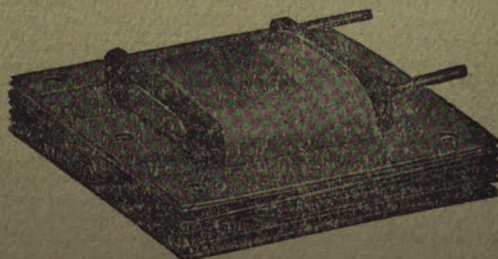
OR

MAGNETO

American Electric Telephone Company



**SELECTIVE
IMPEDANCE
COIL**




**CHICAGO
ILL.**



mem

READ FOR DIRECT
READ FOR DIRECT

THE AMERICAN TELEPHONE JOURNAL



We think the fact of renewing our advertising contract is sufficient evidence that we appreciate **the Journal**. We are not increasing space in any telephone papers, and in fact, have cut down in some of them.

We have found the inquiries from your Journal not only coming in freely, but from a very high class of telephone men.

We have some letters that would indicate even the Bell people read your Journal. We hope this is not heresy.


MALBY LUMBER COMPANY,
Poles and Ties,
Bay City, Mich.

The proof of the pudding is the eating. One of the many proofs that the American Telephone Journal is the best telephone medium is the above letter.

It shows also that persistent advertising in the right medium will bring success to the advertiser of even such an unromantic thing as a telephone pole.

The Journal is the best telephone paper. Our subscribers say so. The Journal is also the best advertising medium. Our advertisers bear witness to the truth of this statement.

The quantity and the quality of our subscribers make advertising results in the Journal a certainty.



Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—APRIL 16, 1904—CHICAGO Number 16

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

RECENT EXPERIMENTS IN WIRELESS TELEPHONY.....	By Dr. Alfred Grandenwitz
THE PARTY LINE: AN EXAMPLE FROM PRACTICE.....	By Rudolph Willard
AUXILIARY TELEPHONE CIRCUITS.....	By Charles H. Coar
TELEPHONE EXCHANGE ENGINEERING. Article XVII.....	By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson
A GROUNDING OR BALANCE KEY.....	By Edward B. Jackson
A TONE TEST.....	By F. C. Greenwald
A MANAGER'S MONITORING CIRCUIT.....	By E. Miller

The Operating Field:

DEMOCRATIC CONVENTION TO BE CONDUCTED TELEPHONICALLY
TELEPHONES HAVE MADE PEOPLE LEFT-EARED
FREE TRUNK SERVICE IN SHELBY COUNTY, ILL.
LONDON-NEW YORK TELEPHONE FIGURES
POSTMASTER ACTS AS TELEPHONE REPEATER
SOUTH DAKOTA TELEPHONE AND ELECTRICAL CONVENTION
WINONA CENTRAL TELEPHONE COMPANY TO EXTEND ITS SYSTEM
QUERIES.

SUMMER SCHOOL FOR ARTISANS
WANTED—DIRECTIONS FOR MAKING A GROUND
TELEPHONE COMPETITION AT TOPEKA, KANSAS.
A FORTY DOLLAR TELEPHONE CONVERSATION
TO PREVENT WIRE HUMMING
TELEPHONE WEATHER FORECASTS
A CHEAP GUY PLATE
PATENTS.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 256.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves.
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve. F

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

New Haven
Novelty Machine Co.,

ELM AND STATE STS.,

NEW HAVEN,

CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

EXTRA POWERFUL

There is always something new under the sun.
Now it is our No. 36 X-P Type Telephone.

It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

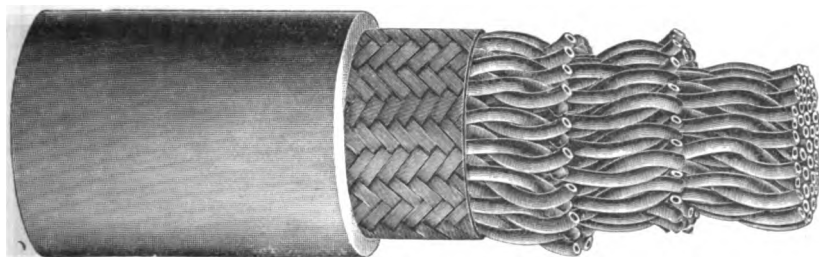
We will tell you more about it if you ask.

ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET - - - CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.



Manufacturers of

"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: ■ ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

Double Galvanized Steel and Iron Wire.



This we carry in stock in regular sizes and of unusual quality. You know what the formal test is—fifteen twists in a six inch length. YOU MAY TWIST OUR WIRE DOUBLE THAT—AND THEN SOME—and it more than stands the acid test for galvanizing, four dips of one minute each in sulphuric acid. Our prices are NO HIGHER than others.

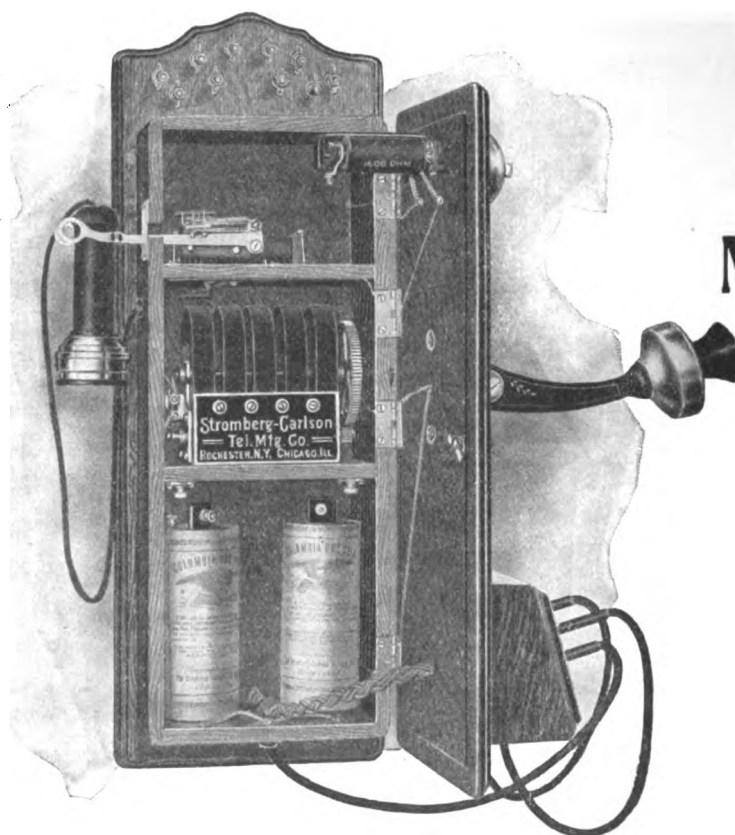
THE F. BISSELL COMPANY TOLEDO, O.

AN INSIDE VIEW OF OUR COMBINATION SWITCHING TELEPHONE

For Connecting Rural Telephone Lines

IT MAKES A VERY SATISFACTORY ARRANGEMENT
FOR CONNECTING A FEW LINES

Easy
to
Operate



Moderate
in
Cost

In localities where there will **never** be more than five lines to connect, this arrangement will give very satisfactory service, although there is nothing quite equal to a regular switchboard. We always recommend a regular switchboard, however, for such work because its use is not so limited.

Our Booklet 30-B—mailed free—describes this apparatus.



No. 55. Jack
TYPE USED WITH ABOVE
TELEPHONE

STROMBERG-CARLSON TELEPHONE MFG. CO.

GENERAL AND EASTERN SALES OFFICE:
ROCHESTER, N. Y.

SALES DEPARTMENT:
CHICAGO, ILL.

Weston Patent Sustained and Jewell and Keystone Instruments Enjoined

The fundamental patent for the Weston Direct Current Electrical Measuring Instrument has just been sustained as valid by the United States Circuit Court for the Southern District of New York, and as infringed by the direct current instruments, both voltmeters and ammeters and of the portable and station type made by the Jewell Electrical Instrument Co., of Chicago, and by the Keystone Electrical Instrument Co., of Philadelphia.

On March 2d, 1904, his Honor, Judge Hoyt H. Wheeler, held patent No. 392,387, dated November 6th, 1888, granted to Edward Weston, for direct current electrical measuring instruments and owned by the Weston Electrical Instrument Company, good and valid, and infringed by the various types of Jewell direct current instruments.

The court said:—

"That this new arrangement of the coil upon pivots in this form of magnetic field, * * * was a great improvement on all or any prior electrical measuring instruments, is very plain and obvious from an observation of the things which had gone before. It involved invention of high order and resulted in great success. Neither the anticipation relied upon, nor the alleged want of patentable novelty, seems to defeat or affect the validity of the patent for this improvement. * * *
Decree for the plaintiff, Hoyt H. Wheeler, J."

On April 2nd, 1904, the same court by his Honor, Henry E. Lacombe, Circuit Judge, granted a motion for preliminary injunction in Weston Electrical Instrument Co. vs. J. Franklin Stevens and another, doing business as the Keystone Electrical Instrument Co. The instruments involved were all of the various types of Keystone direct current electrical measuring instruments.

The court said:—

"Without now making any decision as to the other claims, it is held that 8, 12 and 13 are valid and infringed by defendant's structure, which certainly is as close, if not closer, to device of the patent than was the infringing structure in the Jewell case."

The Weston Electrical Instrument Co. has granted no licenses to any other manufacturers to make or sell its movable coil direct current electrical measuring instrument and all such instruments are unauthorized and are an infringement of the Weston patent No. 392,387.

All who deal in such infringing instruments and all who hereafter put into use any such infringing instruments, and, also, all who continue hereafter to use infringing instruments, previously installed, are guilty of infringement and will be held to strict accountability by the Weston Electrical Instrument Co.

The Weston Electrical Instrument Co. is prepared promptly to supply the entire demand for direct current electrical measuring instruments of all types and for all uses.

Weston Electrical Instrument Co.

Waverly Park, Newark, N. J.-



SPRING IS HERE



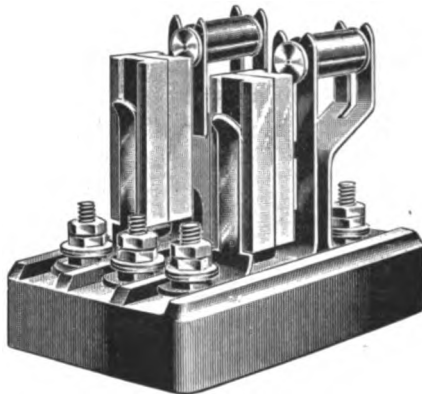
WITH ITS

STORMS

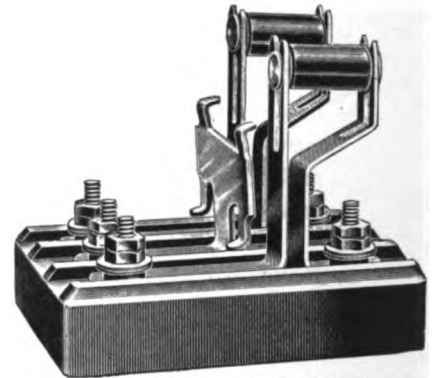
ARE YOU PREPARED?

PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.



Something New in a Protector for Telephones.
Order No. 261 A.



Something New in a Protector for Telephones.
Order No. 261 B.

WRITE FOR PRICES.

STERLING ELECTRIC CO.



LAFAYETTE, IND.



The
CENTURY

COMMON
BATTERY

SWITCHBOARD

ADAPTABLE TO

Magneto Systems

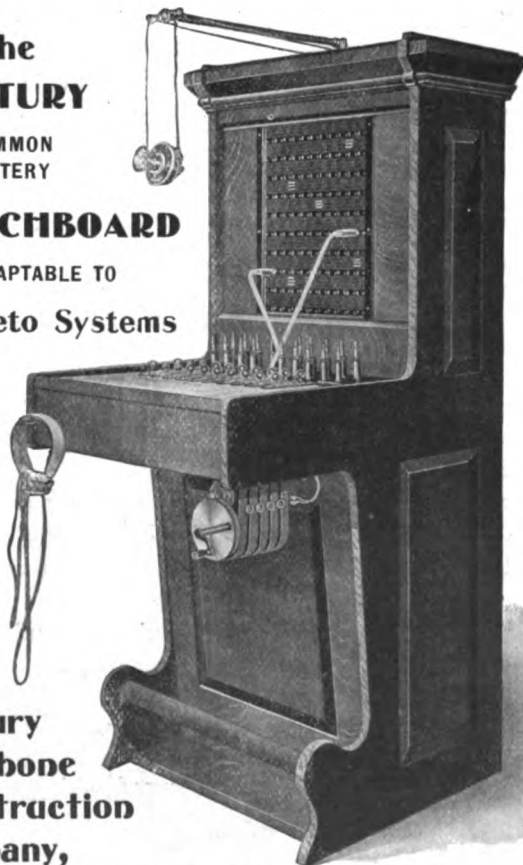
Simple
Durable
Efficient

WRITE
TODAY

Let Us
Tell You
About
It.

**Century
Telephone
Construction
Company,**

536 Ellicott Sq., BUFFALO, N. Y.



IT'S OUR BUSINESS
to convince you that in our new type
EXPRESS BOARD

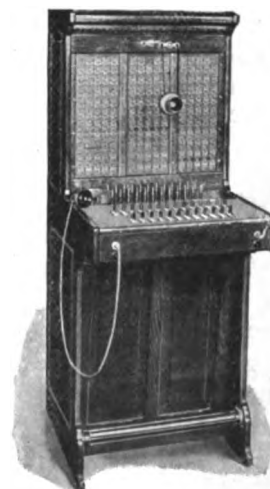
*We have reached
the acme of*

**Electrical and
Mechanical
Perfection**

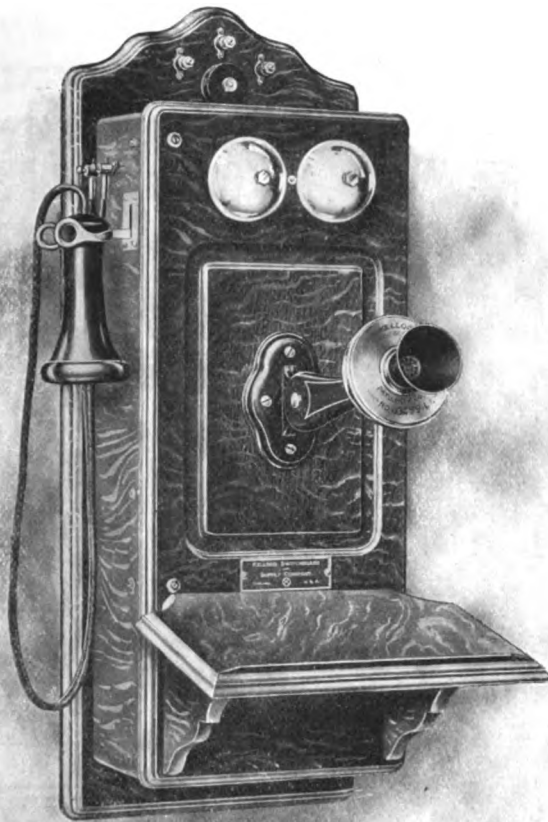
*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



Kellogg Magneto Telephones

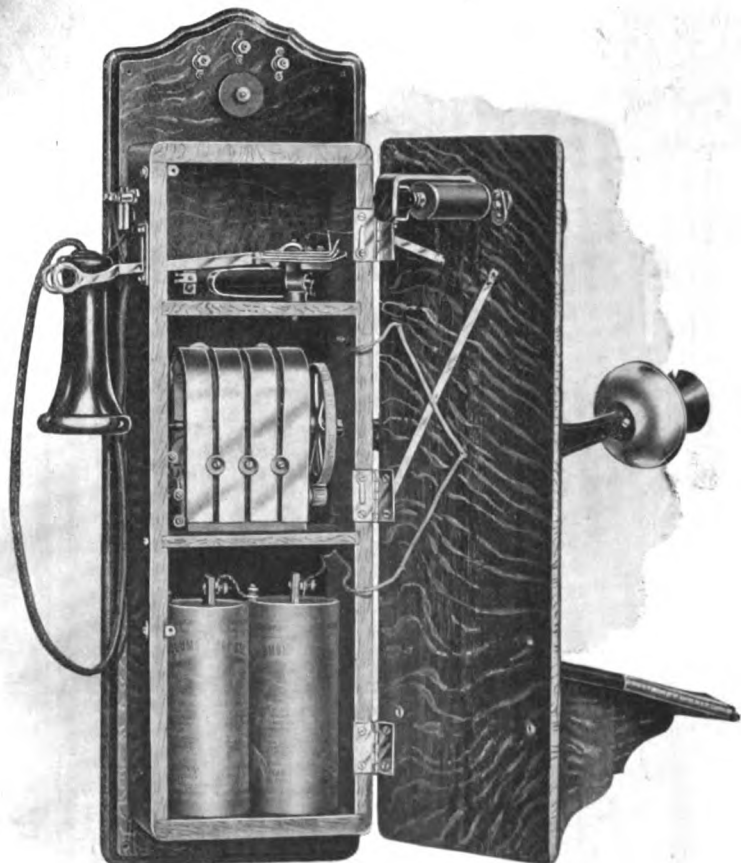


ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

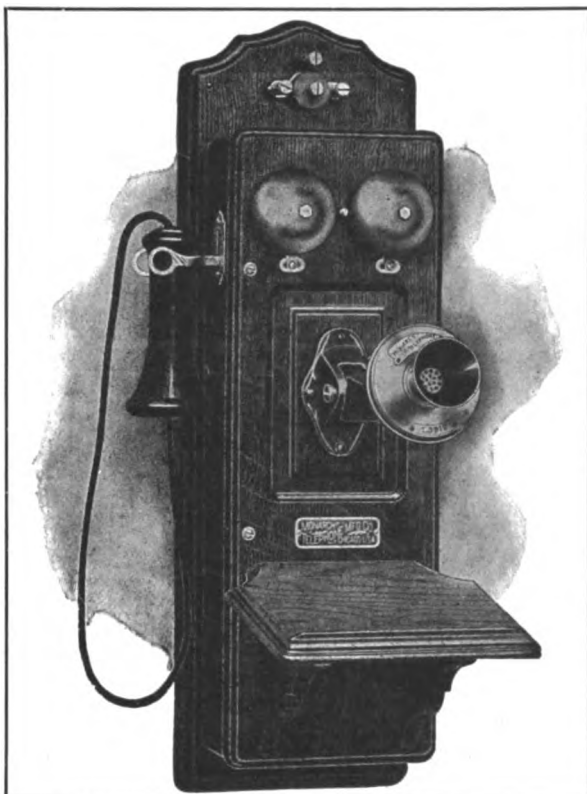
*They are remarkably
durable, compact and
of handsome design.*

*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**
GREEN AND CONGRESS STS., CHICAGO



Electric Building . . . Cleveland
Keystone Telephone Building, Philadelphia



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

Does Any One Use Your Telephone?

Wherever more than one person uses one 'phone—even a desk instrument—there is always need for wider mobility and greater adaptability, except in the case of

THE PENDENT TELEPHONE

whose unrestricted scope and ever readiness place it in a class by itself.

In the office it may be centrally installed and, without effort, be adjusted for use at any desk, while always instantly movable for use at any other point desired.

In the residence it may be so suspended as to permit its ready use upstairs or down; and it is even portable into adjoining or adjacent rooms. If installed in the dining room it may be used without rising; if in the library, without leaving the desk or chair you may be occupying.

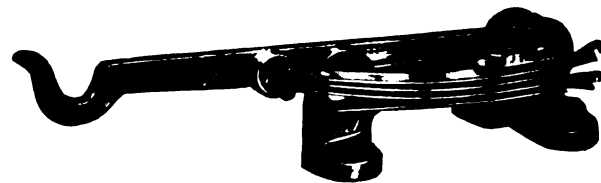
In restaurants, barber shops, hospitals, etc., it is carried by the attendant to and from the seated or reclining patron.

AND IT IS EFFICIENT, HANDSOME,
DURABLE AND INEXPENSIVE.

THE VOUGHT-BERGER COMPANY,
MAKERS OF FIRST-AWARD
TELEPHONES AND SWITCHBOARDS,
LA CROSSE, WISCONSIN.

The reason COUCH TELEPHONE APPARATUS

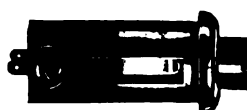
works better than other makes is easily seen when you look at the parts that enter into their construction.



"Justrite" Hook Switch

Sample prepaid 60 Cents.

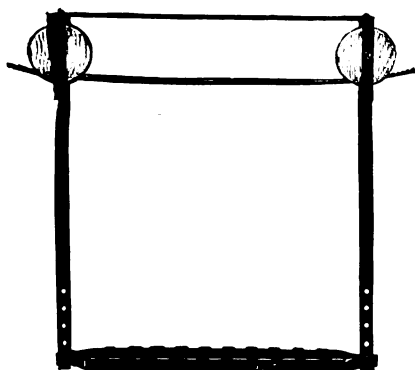
Send for one.



Sample prepaid
25 Cents.

"Workrite" Push.

S. H. COUCH CO.
162 Pearl Street, Boston, Mass.

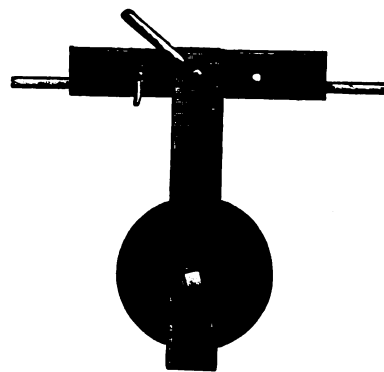
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co. 36
American Electric Tel. Co. 40
Am. School of Correspondence... —
American Vitrified Conduit Co. 39
Automatic Electric Co. 11
Barr, W. J., Mfg. Co. 12
Beidler, Francis & Co. 33
Benedict & Burnham Brass & Cop-
per Co. 11
Bissell Co., The F. 3
Burnley Battery Co. 33
Butterfield, J. F. 34
Camp, The H. B. Co. 39
Central Mfg. Co. 30
Central Telephone & Electric Co.
Century Telephone Const. Co. 6
Chicago, Burlington & Quincy Ry.
Co. —
Chicago Insulated Wire Co. 34
Chicago Writing Machine Co.
Churchill, E. 33
Cohn & Bock. 33
Columbia Electric Co. 11
Columbia Mfg. Co. 33

BATTERIES.

Burnley Battery Co., Painesville,
Ohio.
Electric Appliance Co., Chicago,
Ill.
Nungesser Electric Battery Co.,
Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

BLANKS, BOOKS AND FORMS.

Telephone Printing Co., Defiance,
Ohio.

BONDS.

J. W. Middleton & Co., Chicago,
Ill.

BRASS.

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

BOOTHES.

Yesbera Mfg. Co., Toledo, O.

Connecticut Teleph. & Electric Co. —
Cook, Frank B. 31
Couch, S. H., Co. 8
Crumb, W. H., Co. 34
Dickey Clay Mfg. Co., W. S. 36
Eastern Telephone Mfg. Co. 9
Electric Appliance Co. 3
Elkin Machine Co. 33
Ericsson Telephone Co. 10
Fahnestock Transmitter Co. —
Fowler, John H. 29
Garton-Daniels Co. 11
Gest, G. M. 38
Hemingray Glass Co. 37
Imperial Finance & Cons. Co. 34
Indiana Rubber & Insulated Wire
Co. 3
Ingram-Richardson Mfg. Co. 12
Index of the Technical Press. 30
Inland Steel Co. 32
International Telephone Mfg. Co. 6
Keeling & Ridge Co. 34

CABLES.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chi-
cago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
National Wire Corporation, New
Haven, Conn.
Okonite Co., New York.
Roebing's Sons Co., John A.,
Trenton, N. J.
Standard Underground Cable Co.,
Pittsburg, Pa.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CABLE HANGERS.

Bissell Co., The F., Toledo, O.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., To-
ledo, O.

Kellogg Switchboard & Supply
Co. 7
Klein, Mathias, & Sons. 34
Leslie, A. C., & Co. —
Lewis Lumber & Mfg. Co. 33
Lindsay Bros. Co. 32
McIntire, C. Co. 36
Maltby Lumber Co. 29
Michigan Cedar Co. 33
Middleton, J. W., & Co. 34
Miller Anchor Co. —
Monarch Telephone Mfg. Co. 8
Nagel, W. G., Electric Co. 9
National Telephone Supply Co. 34
National Wire Corporation. 35
New Haven Novelty Machine Co. 2
Nungesser Electric Battery Co. 10
Okonite Company 34
Pacific Coast Pole Co. 30
Pignolet, L. M. 32
Pittsburg Lake Superior Iron Co. 29
Pittsburg Sewer Pipe & Conduit
Co. 36

National Telephone Supply Co.,
Cleveland, O.
Standard Underground Cable Co.,
Pittsburg, Pa.

CABLE SLEEVES.

Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.

CARD INDEX SYSTEMS.

Telephone Printing Co., Defiance,
Ohio.

CIRCUIT CLOSERS.

Garton-Daniels Co., Keokuk, Ia.

CLIMBERS.

Klein & Sons, Mathias, Chicago,
Ill.

Nagel, W. G., Electric Co., To-
ledo, O.

CONDUITS.

American Conduit Co., Chicago,
Ill.

Prosser & Son, L. 33
Roebing's, John A., Sons Co. 32
Sand Point Cedar Co. 30
Scovill Mfg. Co. 2
Spargo, James A., Wire Co. 34
Standard Underground Cable Co. —
Standard Vitrified Conduit Co. 36
Stanton, L. W. 34
Sterling, W. C., & Son. 33
Sterling Electric Co. 6
Stromberg-Carlson Telephone Mfg.
Co. 4
Swedish-American Tel. Co. 12
Telephone Printing Co. 33
Valentine Clark Co. 30
Vought-Berger Co. 8
Wanted, Situations, etc. 256
Weston Electrical Instrument Co. 5-34
Wisconsin Timber & Land Co. 33
Worcester, C. H., Co. 29
Yesbera Mfg. Co. 12

American Vitrified Conduit Co.,
New York.
Camp Co., The H. B., New York.
Gest, G. M., Cincinnati, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Pittsburg Sewer Pipe & Conduit
Co., Pittsburg, Kan.
Standard Vitrified Conduit Co.,
New York.
W. S. Dickey Clay Mfg. Co.,
Kansas City, Mo.

CONNECTORS.

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., To-
ledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chi-
cago, Ill.
Electric Appliance Co., Chicago,
Ill.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 256.

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.

SPECIAL

For a limited time we will sell Series
Wall Telephones at the lowest price
on record. Every telephone guaran-
teed for five years. For particulars,
write us.

EASTERN TELEPHONE MFG. CO.,
WEST CHESTER, PA.

Combination Wall and Desk Set



Does away with the cumbersome nickel set that's always in the way of everybody's elbow.

Equipped with our famous hand-microphone, a complete instrument within itself. Can be hung in any convenient space, under the desk, on it, beside it, or on the wall, if desired.

Having no hook in the magneto,

relieves telephone users of a constant source of annoyance.

Write today for catalog

ERICSSON TELEPHONE CO.

"INDEPENDENT"

Mfrs. of SWITCHBOARDS, TELEPHONES and TELEPHONE SUPPLIES

296 BROADWAY, NEW YORK, N. Y.

ADVERTISERS' DIRECTORY—Continued

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS and CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

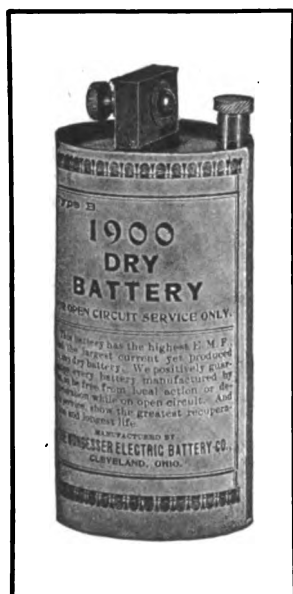
Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

CONTINUED ON PAGE 11.

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

Standard size two and one-half inches in diameter, six inches high, made especially for telephone use, but is adapted to all kinds of bell work.

SPECIFY THE

"1900"

The Manufacturers Stand Behind the Quality of the Goods

THE NUNOESSER ELECTRIC BATTERY CO

Automatic Telephone Service

IN

Lincoln, Neb.

THE new 3,000-station Automatic Exchange installed by the Automatic Electric Company for the Lincoln Telephone Co., began service on March 15th. The entire equipment was installed within six weeks after the exchange building was finished.

Thus, another large Western city throws off the yoke of telephone monopoly.

Are you interested? Write us.

**AUTOMATIC
ELECTRIC
COMPANY**

**CHICAGO
U. S. A.**

ADVERTISERS' DIRECTORY—Continued

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Michigan Cedar Co., Bay City, Mich.
Pacific Coast Pole Co., Spokane, Wash.
Fittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONCLUDED ON PAGE 37.

No Magnets

You can't burn it out if you try

The G. D. DROP

Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple. Durable. Cheap. Pamphlet D6.



GARTON-DANIELS CO., Keokuk, Iowa

"Columbia"

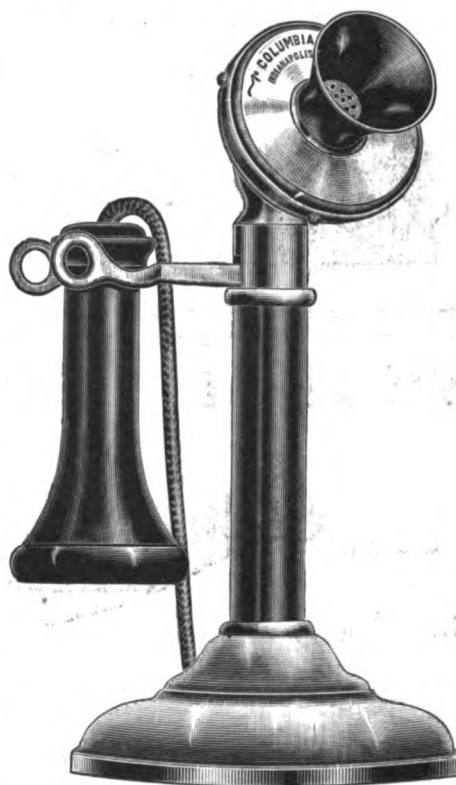
The
Neatest
Simplest
and
Most
Durable

The Price is
Very Low

For particulars write to

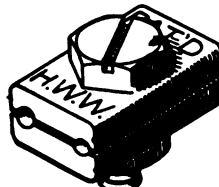
**Columbia
Electric Co.**

FACTORY
McCordsville, Ind.



"H. W. W." WIRE-CONNECTORS

are used for making Test-joints in Telephone Wires on Toll or Exchange Lines. Each plate has two grooves of different depths. By reversal of one plate around the bolt, two wires of the same or of different diameters can be connected.



Simple and effective. Inexpensive and economical. Extensively used by large Telephone Companies. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.



No. 19 Receiver

YOU MAY THINK

you know all about telephones, and yet have never investigated the merits of our product. Take a hint from us and investigate. Our apparatus is the result of industry and sound practice, and represents true mechanical value in every detail.

AN OPPORTUNITY

is all we ask. We can convince you of the superiority of our equipment. Get our prices and specifications before placing your orders.



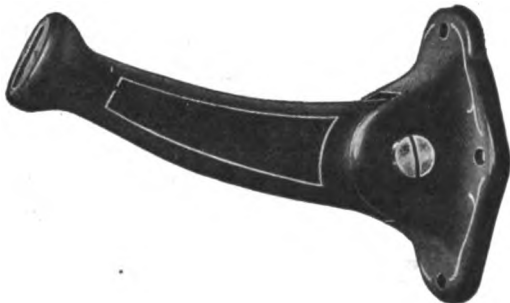
**SWEDISH-AMERICAN
TELEPHONE COMPANY**
CHICAGO ILL.



No. 19 Receiver

WE HELP TO MAKE

A Good
Telephone



ADDRESS "BARRARM," CLEVELAND



A PAY Station without an Iron Enameled Sign is as worthless as a telephone system without a switchboard. Better write now, get our prices and advertise your pay-stations. Our signs are the best, and pay for themselves in no time.

Write to-day or tear out this ad and mail to us with your name and address.

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

Successful Exchange Managers Count

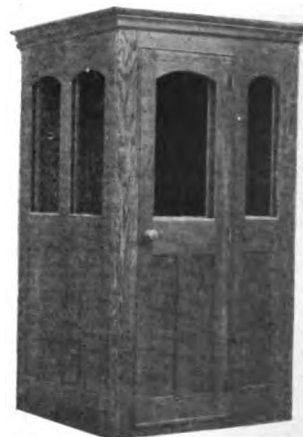
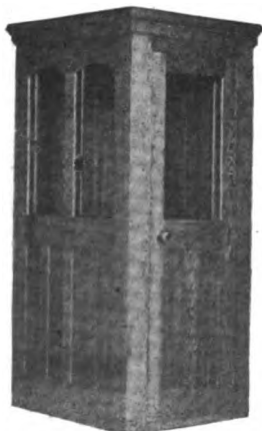
Sound-Proof Booths

one of their best paying investments. They are a necessity for long distance talk and for all public telephones.

Illustrations showing our latest designs sent free on request.

You will have to come to Booths sooner or later. Better come sooner.

YESBERA MANUFACTURING CO.,
TOLEDO, OHIO.



The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, APRIL 16, 1904

NUMBER 16

RECENT EXPERIMENTS IN WIRELESS TELEPHONY

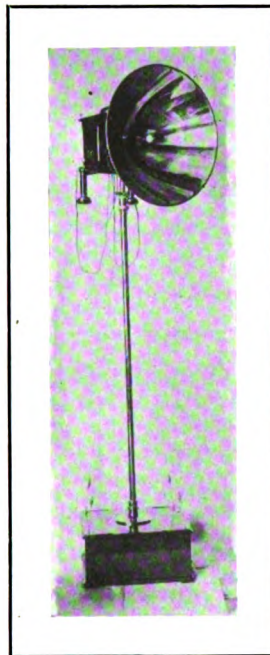
By DR. ALFRED GRADENWITZ.

WHILE wireless telegraphy at the hands of Marconi and many other experimenters has been developed to a high degree of perfection, the results so far obtained in wireless telephony are more modest. Among methods so far proposed that suggested by Mr. E. Ruhmer, Berlin, has given the most satisfactory results; this system consists of an ingenious combination of two interesting physical phenomena, first, the photo-electrical effects of selenium conductors, and second, the so-called speaking arc.

Metals and similar substances, though conveying the electrical current, will oppose to its passage a certain resistance, for any given body a well defined quantity, apart from slight modifications with temperature. Now selenium, an element closely related to sulphur, presents in this respect a peculiar behavior, as its electrical resistance, while high in the dark, is found to be lowered to a considerable degree on being exposed to a more or less intense illumination. This interesting property has been utilized in the construction of so-called selenium cells, consisting of a selenium rod inserted in an electric circuit. If a beam of light falls on this selenium rod, its resistance is lowered to a value ranging between $1/10$ and $1/100$ of its initial value. The intensity of the current in the circuit is increased in proportion so that any variation in the illumination will result in similar variations in the strength of the current. The apparatus thus behaves as an electric cell, susceptible of modifying steady electric currents into varying ones which transmit sound.

The other phenomenon mentioned, that of the speaking arc, was discovered by Prof. Simon, in 1898. He observed that a continuous-current arc lamp would give out very strong cracking sounds, as soon as an electric circuit traversed by feeble intermittent currents was placed in parallel with the arc lamp circuit, and in its immediate neighborhood. This phenomenon is produced even by very low currents, so that the weak induction currents of a telephone circuit are quite sufficient to produce the effect in question. Prof. Simon has now made the surprising discovery that the lamp arc was able to transmit in a most distinct way any whistling, knocking, singing or musical sounds, and even of reproducing the words spoken into the microphone. As, however, the acoustic effect obtained in this way

is small, a pair of hearing tubes must be resorted to. The conditions of these experiments have lately been greatly improved by the use of most sensitive modern carbon-grain microphones.

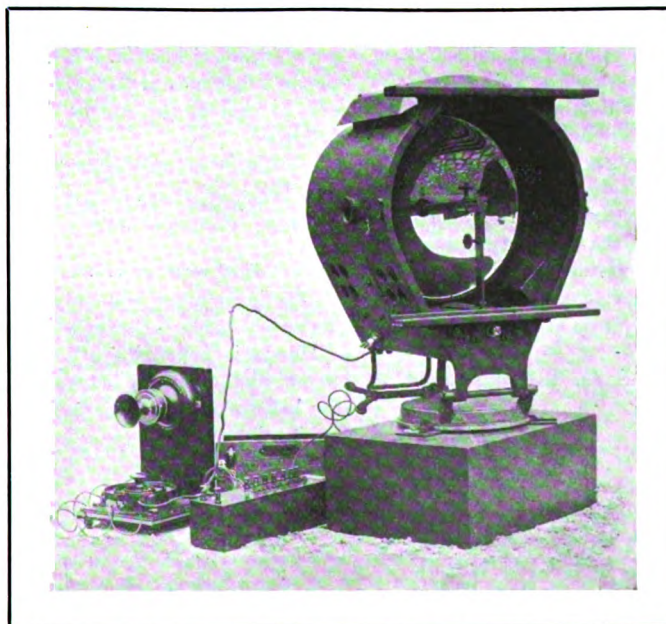


Receiving Apparatus.

The first to utilize the photo-electric properties of selenium in connection with a wireless telephony scheme was Graham Bell, who in 1880 transmitted speech in this way. The light beam issuing from a projection arc lamp was made parallel by a lens, then it was cast against a reflecting membrane placed at the end of a speaking tube, and hence reflected on a selenium cell placed in the focus of a concave mirror. When singing or speaking into the speaking tube, the vibrations of the membrane will cause the rays given off to become alternatively convergent and divergent, thus producing an undulating illumination on the selenium cell connected to two telephones and a battery at the receiving station, this illumination being closely correspondent to the acoustic vibration striking the membrane. As a selenium cell is capable of reacting to very slight differences in illumination, the undulating light rays are reconverted in the telephones into sound waves, more or less analogous with those striking the membrane of the speaking tube. Bell thus succeeded in obtaining communication over distances as high as several hundred meters. Replacing Bell's receiver by a speaking arc lamp, Prof. Simon has largely contributed towards rendering optical telephony available in practice. The high possibilities of the system

were not, however, evidenced until Mr. Ruhmer took up these experiments and by using his own improved selenium cells and the most perfect silvered projectors constructed by the Schuckert Electric Co., he was able to extend the audible range over considerable distances. The first experiments performed outside of a laboratory were his Wannsee trials, perfect transmission of conversations being obtained between the shore of the Wannsee lake and a boat anchored at a distance of nearly 5 miles.

Some months ago, these experiments were further extended in connection with the naval manœuvres in the Kiel harbor. Four ships were used, each being provided with Ruhmer's instruments for wireless telephony. At the beginning the tests took place in the bay of Wyk, and the distance being small, most satisfactory results were obtained. Later the dis-



Sending Apparatus. The Transmitter is on the Left, and on the Right is the Arc Lamp with the Reflector, from which the Light Waves of Varying Intensity are Projected.

tance was increased. Immediately before the beginning of the so-called Kiel week, the final experiments were made. By the courtesy of the Emperor the *Nymphe* was allowed to leave the fleet stationed at the mouth of the Elbe before the manœuvres had ended, when she went to Kiel to have her share in the experiments. The distance between the *Nymphe* and the sending station placed on the coast was finally about 20 miles. The working of the instruments was excellent and apart from some insignificant disturbances, the effect obtained satisfactory.

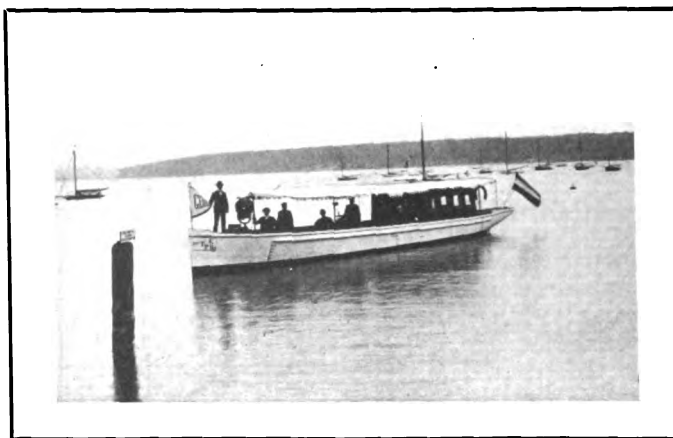
On the first day of Kiel week the Kaiser was present during the experiments, and some days previously the chiefs of the staff of the Admiralty, Vice-Admiral Büchsel, had convinced himself of the usefulness of the new system of transmitting news. Those present would distinctly hear the words spoken on board the *Neptun*, anchored near the Military Academy. The results obtained proved the usefulness of the system for the navy, and these experiments are likely to result in the official adoption of the Ruhmer system in the German navy.

The latest development of the Ruhmer system seems to be a scheme of optical telegraphy brought out by the Siemens-Schuck-

ert Werke. The so-called "*speaking arcs*" are utilized, by superposing on the continuous current circuit of an electric arc lamp placed at the sending station in the focus of a projector, a continuous current frequently broken by means of a mechanical interrupter, the opening and closing being ensured by a Morse key, in accordance with ordinary Morse signals.

At each closing of the telegraph key, the superposed continuous current will modify the luminous intensity emanating from the electric arc giving rise to light oscillations which are projected towards the receiving station. Telegrams are thus dealt with much more rapidly and despatches may be kept strictly secret, as the human eye, incapable of discerning any more than ten luminous alterations per second, will on account of the rapidity of the oscillations, get the impression of a continuous beam.

At the receiving station there is a reflector, in the focus of which a selenium cell is placed and two telephones. The light oscillations of the sending station will result in humming intermittent sounds being produced through the changes in the resistance of the selenium cell, thus constituting *acoustical Morse signals* that are directly audible.



Wannsee Lake Experiments. The Wireless Telephone Apparatus May Be Seen in the Bow of the Launch.

THE PARTY LINE: AN EXAMPLE FROM PRACTICE

By RUDOLPH WILLARD.

SOMETHING less than 1,000 miles from New York City, there was an attractive little town, located in the center of a rich and prosperous farming community; it formed the terminus of a large railway, whose yards and shops, taken in connection with several other prominent manufacturing industries, made it a place of somewhat more than usual activity and importance. For many years it had been a Bell stronghold, but this company only secured a couple of hundred subscribers from the 10,000 or 12,000 inhabitants. With the advent of the Independent movement came the prospects of a better service. A local company was formed, an exchange installed, and the friends of the promoters, as well as the enemies of the Bell, rallied about the new institution. The manager was a resident who knew, and had known, every man, woman and child from birth. Like all good Independents, this little exchange started out with the idea of giving the best and most expeditious service, and refused to place more than a single instrument on a line. At the end of the first year the exchange found itself with 200 business subscribers and 300 residence lines. For business, the rates were \$24 and for residences, \$20. An analysis of investment and expense is shown in Table I., which is on the page opposite. The figures and accounts shown are based on fact. Names and exact sums are for obvious reasons withheld.

The income account and balance sheet for the year stood as follows:

200 business telephones at \$24.00.....	\$4,800.00
300 residence " " 20.00.....	6,000.00
Total earnings	\$10,800.00
Operating expense	\$8,500.00
Earnings above operation	\$2,300.00
Deduction, 5 per cent. on \$25,000 in bonds	1,250.00
Income available for dividends	\$1,050.00

As there was \$25,000 in stock out, this made the manager look

a little blue, for in addition to an expected dividend he knew that, sooner or later, contingencies would arise and that some surplus must, from year to year, be provided or else, ultimately, the capital would be impaired. How to improve the revenue was the question. To all of the various seductive forms of advertising recourse had already been made. Every personal friend had a telephone, and yet there were at least 9,500 people in town who did not support the new venture. With much fear and trembling the manager decided to become a renegade and to desert the tenets of the Independents by offering party line service. So he went to work and spread broadcast the information that two party business lines would be supplied at \$20 and four party residence telephones at \$15. The result was 500 additional subscribers, so that at the end of the year the income account stood as follows:

200 business 1 party lines at \$24.00.....	\$4,800.00
200 " 2 " " " 20.00.....	4,000.00
300 residence 1 party lines at \$20.00.....	6,000.00
300 " 4 " " " 15.00.....	4,500.00

Total earnings

\$19,300.00

The investment and operation of the second year are shown Table II. (See opposite page.)

Hence it appears that investment had been increased about \$6,000 and operating expenses about the same amount, so that the balance sheet stood as follows:

Total earnings	\$19,300.00
Operating expenses	13,700.00

Earnings above operation	\$5,600.00
Deduction, 5 per cent. on \$30,000 bond	1,500.00

Income available for dividends	\$4,100.00
About 8 per cent. on stock.	

Such is the significant history in figures of a couple of years' operation. It might be the history of many similar undertakings. While too much credit cannot be awarded the Independent move-

ment for its steadfast endeavor to offer the subscriber the best service that the state of the art can afford, it must not be forgotten that the service should be graded to fit the customer. It is as inexpedient for a telephone company to offer but one form of service as it would be for a railway to run only Pullman cars or

emigrant trains. To offer party line service, where traffic exceeds eight or ten calls per day, is inexpedient. It is equally unwise to insist that stations making but one or two calls shall be charged with the expense necessary for an equipment adequate to the greater traffic.

AUXILIARY TELEPHONE CIRCUITS

By CHAS. H. COAR.

MANY instances arise when it becomes desirable to amplify the subscribers' sub-stations by installing an additional telephone jack box to enable the set to be carried from room to room or additional bells. Apparatus of this kind is usually known by the name of extension sets. Formerly such

Fig. 1 shows an arrangement for telephones which is often desirable for business men who do not care to answer all calls themselves. In the illustration 1 is the main telephone, which is equipped with signal bells. Nos. 2, 3 and 4 are extension sets, which are so wired that from them the central office may be

called, but the central office cannot signal either one of these additional stations. Upon the main instruments the push buttons 2, 3 and 4 are arranged, which actuate the vibrating bells, correspondingly numbered. The battery *B* is placed in such a manner that none of the telephones will be required to talk through it, although one side of the telephone circuit is used as a common wire to excite all of the vibrating bells. The operation is as follows: The telephone 1 is usually so placed that a clerk may answer it when the signal is received. After the wishes of the calling party are obtained this clerk can by touching a button, signal to any one of the extension sets that a call is waiting.

The method of giving one telephone set control over the remaining instruments upon the same circuit is shown in Fig. 2. Here the number 1 is the instrument which controls; 2 and 3 are the other stations. The circuit should be so wired that one of the line binding posts is connected directly to the body of the

TABLE I.—ANALYSIS OF FIRST YEAR'S BUSINESS OF THE X. Y. COMPANY.

Plant.	Investment.	Depreciation.	Maintenance.	Traffic.	Insurance.	Taxes.	General Expense.
Central station	\$8,000.00	\$480.00	\$250.00	\$2,000.00	\$100.00	\$150.00	.....
Sub-stations	9,000.00	720.00	500.00	.....	.....	150.00	.....
Aerial cable	10,000.00	1,000.00	150.00	.....	.....	175.00	.....
Open wire	4,000.00	480.00	200.00	.....	.....	60.00	.....
Poles	4,200.00	500.00	200.00	.....	.....	60.00	.....
<i>Operation.</i>							
Manager's expenses .....	.....	.....	.....	.....	.....	.....	750.00
Directory .....	.....	.....	.....	.....	.....	.....	75.00
General office expenses.....	.....	.....	.....	.....	.....	.....	300.00
Lost accounts .....	.....	.....	.....	.....	.....	.....	100.00
Advertising .....	.....	.....	.....	.....	.....	.....	100.00
Totals	\$35,200.00	\$3,180.00	\$1,300.00	\$2,000.00	\$100.00	\$595.00	\$1,325.00
Cost per station.....	70.40	6.36	2.60	4.00	.20	1.19	2.65
Cost per station for installation, \$70.40.							
Cost per station for operation, \$17.00 per year.							

TABLE II.—ANALYSIS OF SECOND YEAR'S BUSINESS OF X. Y. COMPANY.

Plant.	Investment.	Depreciation.	Maintenance.	Traffic.	Insurance.	Taxes.	General Expense.
Central station	\$9,000.00	\$540.00	\$300.00	\$4,500.00	\$150.00	\$150.00	.....
Sub-stations	14,000.00	1,120.00	1,200.00	.....	.....	300.00	.....
Aerial cable	10,000.00	1,000.00	150.00	.....	.....	175.00	.....
Open wire	4,500.00	540.00	225.00	.....	.....	60.00	.....
Poles	4,200.00	500.00	200.00	.....	.....	60.00	.....
<i>Operation.</i>							
Manager's expenses .....	.....	.....	.....	.....	.....	.....	900.00
Directory .....	.....	.....	.....	.....	.....	.....	150.00
General office expenses.....	.....	.....	.....	.....	.....	.....	450.00
Lost accounts .....	.....	.....	.....	.....	.....	.....	300.00
Advertising .....	.....	.....	.....	.....	.....	.....	200.00
Totals	\$41,700.00	\$3,700.00	\$2,075.00	\$4,500.00	\$150.00	\$745.00	\$2,000.00
Cost per station.....	41.70	3.70	2.08	4.50	.15	.75	2.00
Cost per station for installation, \$41.70.							
Cost per station for operation, \$13.18 per year.							

circuits were very much more common than at the present, because now the private branch exchange is in many instances taking the place of the additional instruments formerly installed.

switchhook as indicated; then one side of the telephones 2 and 3 runs directly to the line, while the other side terminates in the rest contact of the switchhook in No. 1. Thus, as soon as the

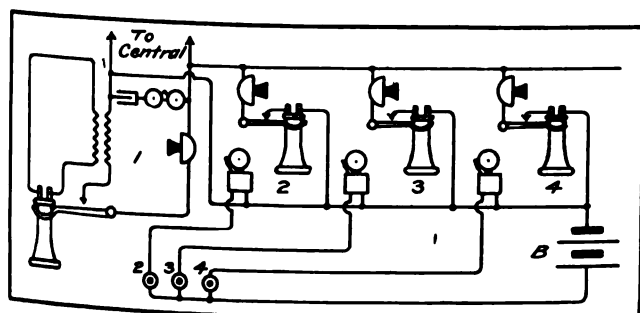


Figure 1.

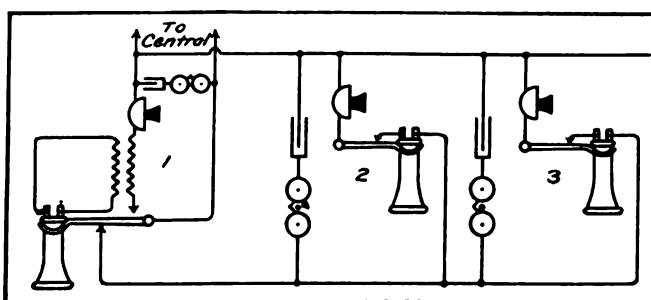


Figure 2.

Yet, in many cases, extension sets of all kinds are requested, and it is the object of this paper to describe a few of the cases which are convenient for this purpose.

receiver is removed at station 1, one side of the line to the other two instruments is opened. This circuit is advantageous when one party desires a line which is absolutely secret.

In Fig. 3 the farmer's line is shown ending in the exchanges *A* and *B*. Here, a signal emitted by any instrument in the endeavor to call another one upon the same line is also received at the exchange and sometimes causes confusion. By means of code signals this difficulty may be practically avoided. Some manufacturers improve upon this circuit by arranging a generator capable of delivering two kinds of current, one of which is used for signalling the exchange, while the other is employed for the sub-stations. In Fig. 3 another circuit is shown, giving a solution of this difficulty. Each of the stations is supplied

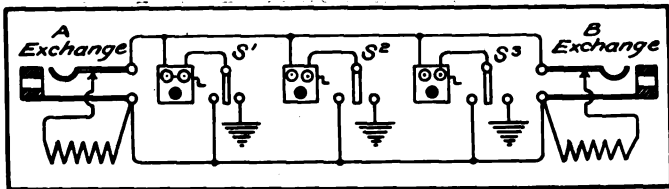


Figure 3.

with a three point switch, one terminal of each telephone is connected to one side of the line, while the other runs to the lever of the switches designated by *S*¹, *S*² and *S*³. One point of each switch is connected to earth and the other to the line. Normally the switch levers are raised against the ground contacts whenever the telephones are not in service. When one station wishes to call another, one side of the line is used with the earth as a return. Thus both switches may be moved to the metallic points and talking executed unobstructed by ground connections.

In case any station desires to call the exchange the switch is thrown to the line side. By this means it is obvious that the central office is called metallically while each subscriber can call any other one over the grounded circuit. When conversation is completed, in case the subscriber fails to properly install the switch, he can thus be signalled, though with the disadvantage of calling the central office.

The circuit of Fig. 4 is a familiar one to most telephonists. If this arrangement of jacks is intended to operate upon a toll line

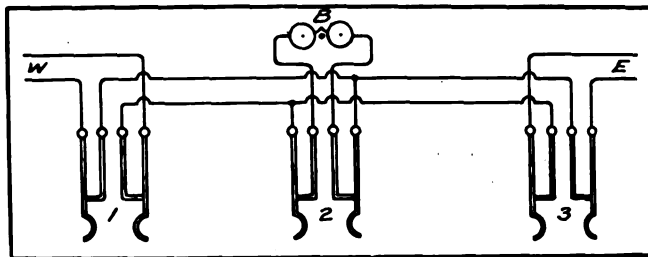


Figure 4.

it is possible to easily open the circuit for test in either direction, but this requires the telephone sets to terminate in a plug that is arranged to fit the jacks 1, 2 and 3. There is a further advantage in this arrangement that in case a portion of the line is being used for conversation, the remaining two jacks can be cut out by opening the jacks with the proper plugs. Experience has shown that it is an exceedingly convenient arrangement for many cases.

TELEPHONE EXCHANGE ENGINEERING

ARTICLE XVII.—MULTIPLE CABLE—*Continued*

By RAY H. MANSON, ALBION D. T. LIBBY AND CHARLES A. SIMPSON.

THE multiple cable used in the switchboard design covered by this series of articles is of the three wire type, having a twisted pair of wires for the talking circuit and a third wire for operating the local signal apparatus. There are twenty groups of these wires to correspond to the jacks mounted in each strip and an extra set of 3 spare wires for use if any of the regular wires become defective, making a total of 63 wires in a cable. These sets of wires are provided with distinguishing colors in their insulations, which serve as an easy means for identification in forming and testing. The color scheme is given in the table, Fig. 57.

The following is a brief outline of the mechanical operations

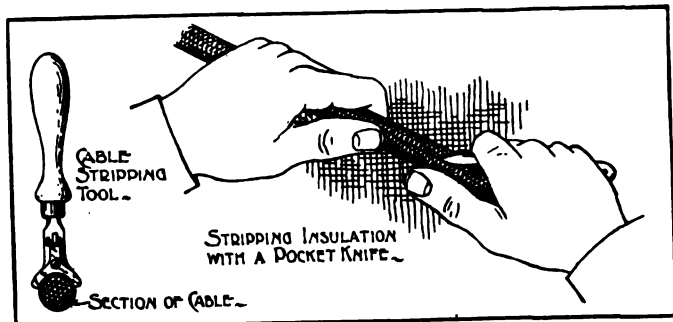


Figure 43. Special Cable Stripping Tool and Preparing to Strip Cable.

of preparing this machine made cable for the switchboard multiple: The cable is first unwound from its reel, over a long measuring table, and the position of the butts and strippers marked. The outer covering or braiding of the cable is then cut through at the indicated places by means of the stripping tool shown in Fig. 43. The outer insulation thus severed is next removed from between the butt marks, and the raw edge protected by a strip of linen tape, about one-quarter of an inch in width, applied as shown in Fig. 45.

DOUBLE MULTIPLE FORMING: The cable is now clamped at the butts in double forming frames, as shown in diagram, Fig. 58, thereby leaving the loose wires free to be formed out. The wires

are arranged in the forming operation according to the color code, beginning with blue at the right hand side of the forming frame, see Fig. 59. Each pair with its accompanying third conductor is selected in turn and passed around a finger on either side of the frame, and anchored in the combs at the middle, the three spare wires being formed at the end with the last regular

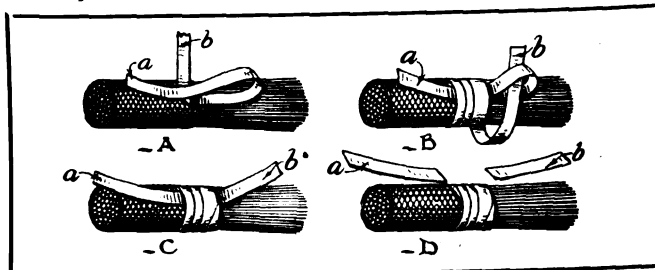


Fig. 45. Butting a Cable.

set. After all of the wires are arranged in the form, that portion grasped by the forming fingers (on both sides of the frame) is sewed up with a short waxed linen twine, using a stitch similar to that shown in Fig. 47.

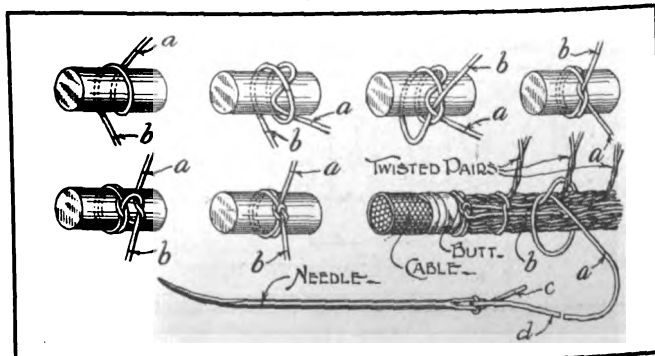


Fig. 47. Packer's Needle and Cable Knot.

Another method of sewing up the cable commonly used is done by threading the needle, as shown in Fig. 60, and commencing

ing at the butt by making a noose around the cable, the double cord is wrapped spirally around the bundle of wires, passing under at each finger, so as to include each set of conductors as it leaves the form at these points. A half hitch is taken next to

COLOR SCHEME - 63 WIRE CABLE		
LINE (GROUP) NUMBER	TWISTED PAIRS MADE UP OF WHITE (TIP) WIRES TWISTED WITH FOLLOWING (RING) WIRES:	SINGLE WIRES FOR SLEEVE (TEST) OF LINE CIRCUITS
1	BLUE	BLUE & RED
2	ORANGE	ORANGE "
3	GREEN	GREEN "
4	BLACK	BLACK "
5	SLATE	SLATE "
6	BLUE & WHITE	BLUE, WHITE & RED
7	" ORANGE	" ORANGE "
8	" GREEN	" GREEN "
9	" BLACK	" BLACK "
10	" SLATE	" SLATE "
11	ORANGE & WHITE	ORANGE, WHITE & RED
12	" GREEN	" GREEN "
13	" BLACK	" BLACK "
14	" SLATE	" SLATE "
15	GREEN & WHITE	GREEN, WHITE & RED
16	" BLACK	" BLACK "
17	" SLATE	" SLATE "
18	BLACK & WHITE	BLACK, WHITE & RED
19	" SLATE	" SLATE "
20	SLATE & WHITE	SLATE, WHITE & RED
SPARES	RED	RED & WHITE

Fig. 57. Color Scheme Table.

the last finger and two at the last finger, thus making the cord fast. This method of sewing is shown diagrammatically in Fig. 61.

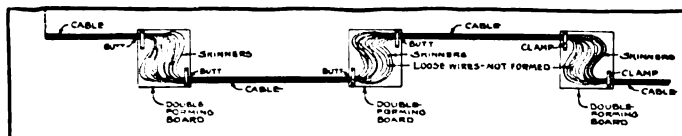


Fig. 58. Cable Clamped in Forming Frames.

WAXING: The preceding operations have been done without the necessity of waxing the wires to prevent the fraying of their dry insulation, as the only dead ends presented are at the ex-

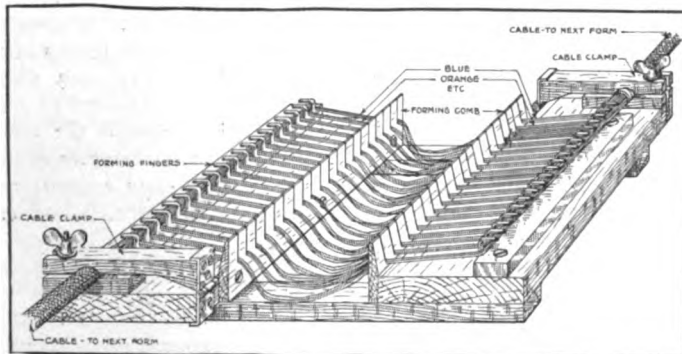


Fig. 59. Cable in Forming Frame.

terminities of the cable run. This leaves the colors with their original brilliancy during the forming, and are more easily distinguished. The operation of skinning, however, requires the

double forms to be cut apart, so the waxing should now be done. The lengths of formed cable are doubled up so as to leave the

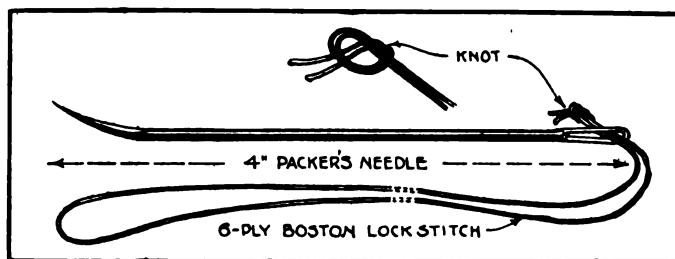


Fig. 60. Needle and Knot for Cable Sewing.

formed portions together and are then dipped into boiling bees-wax compound, up to and including the butts, for a few minutes, after which they are allowed to drain while subjected to a

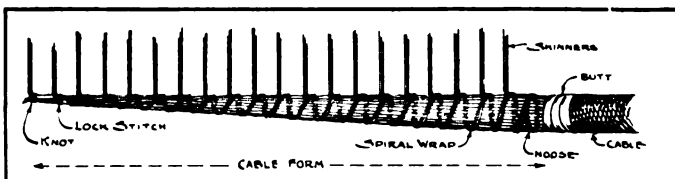


Fig. 61. Method of Sewing Cable.

temperature sufficient to keep the wax melted. As previously explained, this wax serves the second purpose of a moisture repellent.

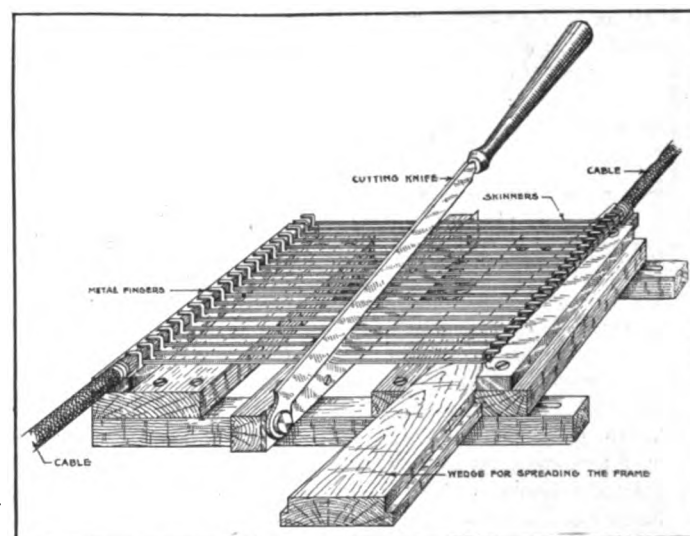


Fig. 62. Cutting Cable Apart.

CUTTING: The cable is now cut apart through the double formed portion by stretching each form over fingers similar to those used in the forming operation, and then severing all of the intervening conductors with one cut of a large pair of shears, guided so as to leave the wires of the proper length. This operation is illustrated in Fig. 62.

SKINNING: The formed ends of the cable are now placed in a skinning frame, consisting of a set of fingers to hold the cable

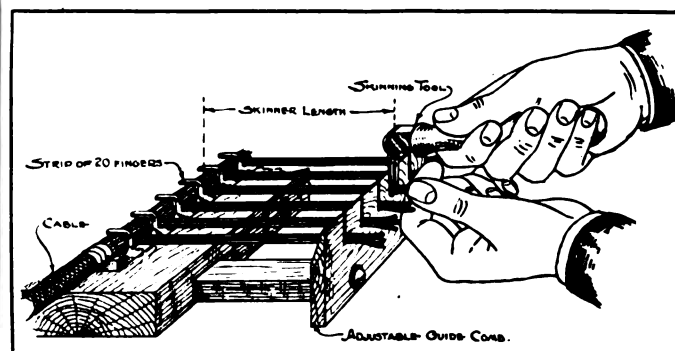


Fig. 63. Skinning Ends of Wires.

and an adjustable comb for gauging the length of the skinner, to make it correspond to the various forms. The insulation on the

ends of the wires projecting through the comb is removed one group at a time by means of a skinning tool (Fig. 63). During this operation the wires should be drawn tight with the left hand, while the tool is drawn over the wires with the right, next to the comb as a guide, and then a straight away pull with both hands will cause the insulation to be severed and removed. The cables thus prepared are ready for soldering into the jack terminals.

SOLDERING: The 20 per strip multiple jacks have their 60 terminals located in three rows of 20 each. The top row being connected to the *test*, or *sleeve springs*, the middle row to the *tip springs* and the lower row to the *ring* of the various jacks. The jack strips for a complete run are clamped on the soldering table with the sleeve springs uppermost, and all of the cables necessary for connecting these jacks from the distributing frame, through the multiple, are placed in their proper positions. The soldering at any one strip is done by first selecting all the ring

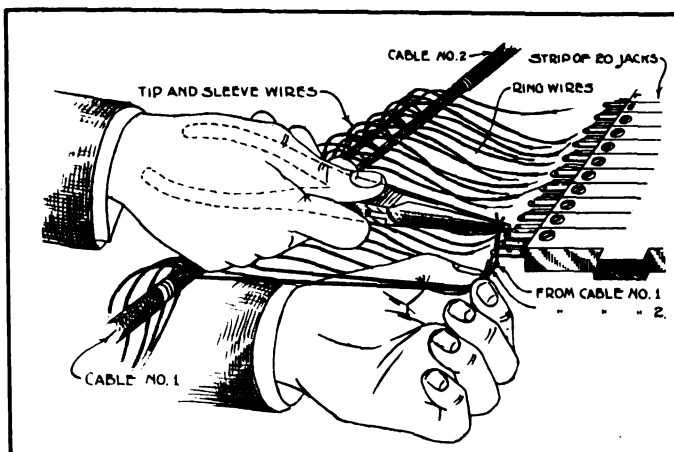


Fig. 64. Inserting Wires in Jack Terminal.

wires of the two adjoining cable forms and turning the remainder back, out of the way. The bare ends of the No. 1 ring wires (blue covered) from each cable are inserted through the first jack terminal of the lower row up to the insulation and bent over to the front, as shown in Fig. 64. Care should be taken not to have any threads of insulation come through the hole in the terminal, as in that case it will be impossible to make a good soldered joint. After the 40 ring wires are inserted in their proper terminals, they are soldered with resin core solder, with a pointed soldering iron.

Resin core solder is now a commercial article, and in its best form contains the proper amount of flux in its body to give quick and reliable results. Acids or other fluxes which contain corroding or current carrying chemicals, should never be used under any condition for soldering on telephone apparatus.

The surplus ends of the wires are clipped off close up to the terminals with a pair of diagonal cutters, as shown in Fig. 65. The wires for the remaining rows of jack terminals are separated in turn and soldered in like manner. The separate cables con-

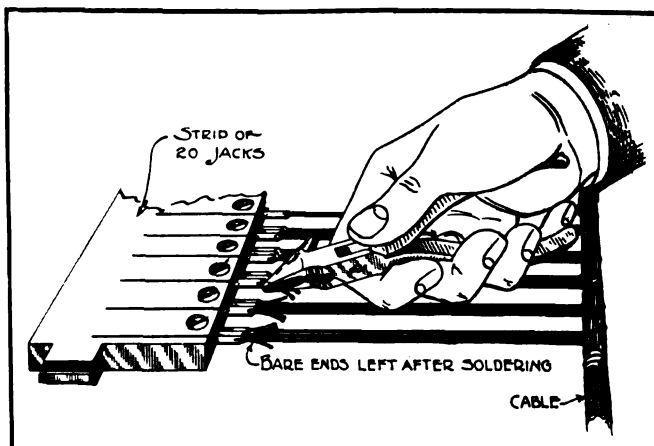


Fig. 65. Clipping Off Surplus Wire Ends.

stituting the run are sewed together where they overlap by means of waxed linen twine, thus making their length continuous. The looping-in wires are usually smoothed out by rubbing with a tool, known to telephone men as a "hickie," see Fig. 66. This completes the operation of preparing the multiple cable for the switchboard, but before leaving the factory all of the work should be carefully examined and electrically tested from each jack to the distributing frame end for crosses, opens, transpositions, insulation, etc. The formed portions of the cable runs

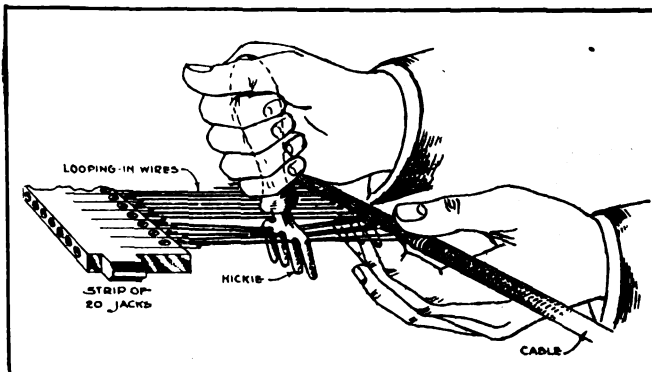


Fig. 66. Smoothing Out Wires with "Hickie."

are sometimes given a thin coat of shellac to serve as a finish and to prevent dust and dirt from sticking to the wax, which has been previously applied.

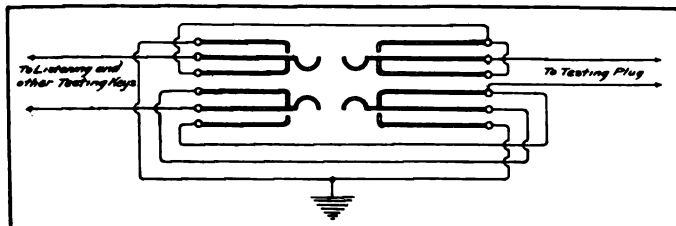
(To be continued.)

A GROUNDING OR BALANCE KEY

By EDWARD B. JACKSON.

THE sketch shows a grounding or balance key which will be found a valuable aid in testing magneto and toll lines.

When the key is thrown in one position the listening circuit is grounded and one side of the line is opened. When



A Grounding or Balance Key.

thrown in the other position the listening set is grounded and the other side of the line is opened. If the line be crossed with a central energy circuit, ground or battery will be indicated. The voltmeter will indicate the presence of battery. Such a cross

can be easily detected by the use of the balance key. In such a case one position of the key would show considerable more noise than the other. The approximate location of an open may also be estimated in this way. If the open is at the far end of the line, the line will be in good balance. If it is close to the testing end one position of the key will be quiet and the other quite noisy. With a little practice one can make a good estimate as to the location of the open. A line in good condition, no matter how long, will be in perfect balance.

BELL INSTRUMENT REPORT SHOWS SHRINKAGE.

THE American Telephone & Telegraph Company's instrument output statement for February shows a gross shrinkage of 7,442 instruments and a net shrinkage of 9,347. The total number of instruments now outstanding amounts to 3,880,616, against 3,293,527 last year. The gross output for February was 84,402, as against 91,844, and the net output 47,309, as against 56,656 for last year.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



BUSY TEST ON TWO WIRE MULTIPLE.—(316.)

I would like to have you explain how the busy test is managed where there are but two wires in the cords, and where only two wires go to the multiple jacks, as in the Kellogg system.

T. R. B.

The test may be obtained in precisely the same manner as previously explained under query 294 for an incoming trunk circuit. The Kellogg system, however, uses an auxiliary test relay. Referring to Fig. 316, the test circuit is indicated in heavy lines.

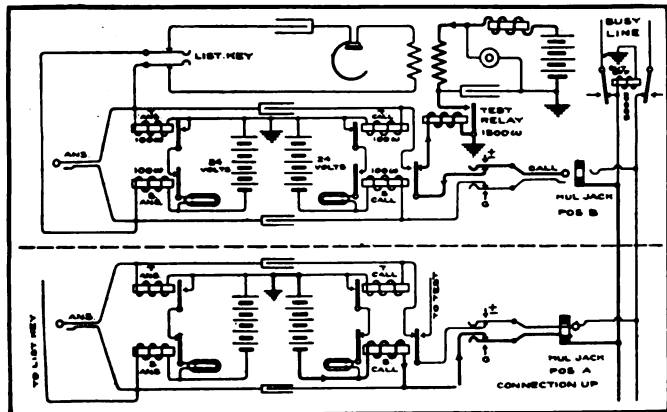


Figure 316.

A busy jack is shown, a plug being up at position *A*. This puts battery on the sleeve of the jack through the sleeve calling relay. The operator at position *B*, when testing, touches the tip of the plug to the sleeve of the jack and thus causes a flow of current through the test relay, which pulls up and closes the primary winding of the induction coil to ground. This permits a rush of current through the primary and induces a flow in the secondary, which causes a click in the operator's receiver. It is necessary when testing to have the listening key thrown to the listening position in order to close the secondary circuit. The high resistance of the test relay is necessary to prevent too great a flow of current from the line, which would cause a disturbance and interfere with conversation.

OPERATOR'S CIRCUIT QUESTIONS.—(317.)

Please explain theory of transmission of circuit below *A*, Fig. 317, and would it make any difference if primary *P* of induction coil was in series with retardation coil transmitter and battery?

L. E. B.

The circuit you show is the Kellogg operator's set and is a modification of the one used by the Western Electric Co., shown in Fig. 317 at *B*. The change was made to evade the patents con-

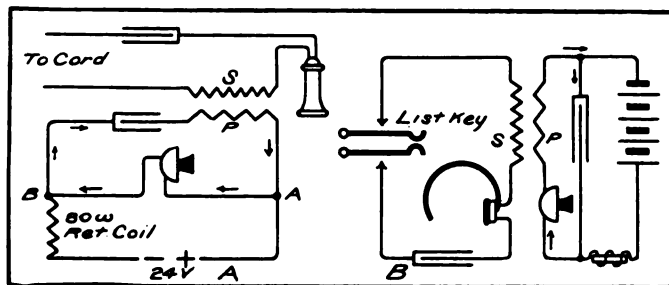


Figure 317.

trolled by the latter company. The theory of operation is as follows: Any variation in resistance caused by the vibrations of the transmitter diaphragm produces a difference in the potential between the points *A* and *B*. There will be a flow into the condenser corresponding to this difference of potential, so the same effect is obtained as though the primary was in the transmitter circuit. The condenser will charge and discharge in exact accord with the variations in the transmitter and thus produce a flow of current through the primary. The operation may also be

considered from the standpoint that the highly vibrating voice currents will not pass the retardation coil, but are deflected through the condenser and primary.

INCANDESCENT LAMPS IN RINGING CIRCUIT.—(318.)

Will you kindly advise me as to the best way to connect two 52-volt electric lights in connection with a Warner pole changer to test for grounds on

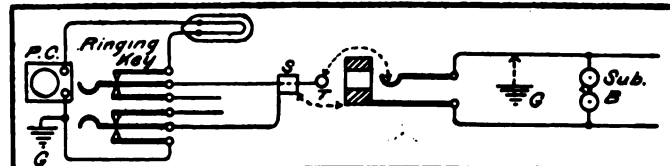


Figure 318a.

metallic and grounded lines? Give diagrams if convenient, and oblige subscriber.

O. M. D.

A 110 volt 16 candle power incandescent lamp is used for ringing resistance on large switchboards. One lamp is provided for each operator's position and wired in the tip connection to the ringing keys, as shown in the accompanying diagrams, Figs. 318a, b, c and d. The sleeve side of the ringing generator is permanently grounded. Then, when an operator rings on a grounded or short circuited line, the lamp resistance will prevent an extreme amount of ringing current from being consumed, thus not

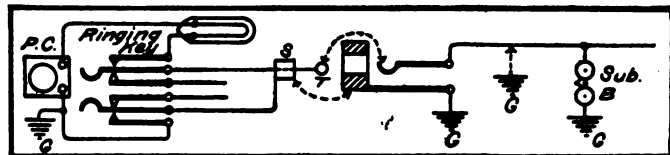


Figure 318b.

cutting down the available supply so as to effect the ringing on other operators' positions. The lamp will light when the ground or short circuit is of low resistance and will serve as an indicator if mounted so as to be in view of the operator. The fact that a low resistance ringing path through a series (80 ohm ringer or even higher) line will also light the lamp is enough to prevent any absolute indication of grounds or crosses with this

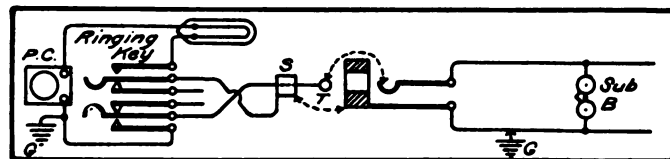


Figure 318c.

method. With the wiring shown in Figs. 318a and b only grounds can be indicated on the tip side of a metallic circuit, and in order to test for the sleeve side the ringing circuit would have to be reversed so as to put the lamp side of generator on the sleeve and the ground side on the tip. Fig. 318c and Fig. 318d shows two 52 volt lamps, one on the tip side and the other on sleeve side

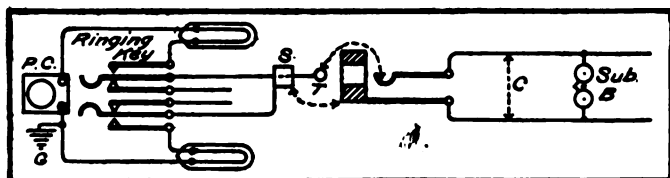


Figure 318d.

of the generator connection. With this wiring a cross can be detected from a ground, as both lamps will light when a cross exists and only the tip lamp lights when a ground exists on the tip side of line. The sleeve lamp will not, however, show a ground on the sleeve side of line, as this is the ground side of the generator.



HOW INVESTORS ARE DECEIVED.

SOME weeks ago the AMERICAN TELEPHONE JOURNAL called attention to the systematic deception practiced by the Bell telephone corporation, in order to create an impression that

Independent telephone systems could not be made to pay. The Bell interests have been known, before this, to encourage some alleged "Independents" weakling for the sole purpose of finally absorbing it into the Bell system and then startling the world with the announcement that another Independent company has succumbed to the inevitable and sold out to the Bell. Therefore, when the Cumberland Telephone and Telegraph Company, one of the most notorious of Bell concerns, purchased the "Independent" telephone system of William A. Peeples of Shawneetown, Illinois, last month, real Independent operators naturally expected to see the fact exploited through the country press, at so much per line.

They didn't have long to wait. The Evansville, Indiana, *News* in its issue of March 27, under glaring headlines, announced the sale as "proof positive" that there is no money to be made by the operation of Independent telephone companies; all of which is "important, if true." But like most statements emanating from the Bell monopoly, the small drop of truth contained is so diffused through a great waste of deceit, it is really worse than a direct falsehood. It would be interesting to reprint the article in question in full, as an illustration of Bell methods, but it is too long. The statement in brief is summed up in one small paragraph credited to Mr. Peeples himself, in which he is quoted as saying:

"Our experience has proven to our minds, beyond any question of doubt, that telephone companies depending on the rental of telephones for their support, will realize just as we have, that they are up against a losing proposition. Why, if we had not been able to dispose of the property, we would have cut the poles down and sold the equipment as junk."

When it is understood that this entire article is, in reality, as far as the newspaper is concerned, an advertisement, paid for by the Bell people at advertising rates, the deception can be passed over with a smile of derision and contempt. But the general public is not always aware of the real condition of affairs and the probabilities are that even the newspaper in question was deceived in the matter, not a difficult thing to do when a rich corporation is willing to pay regular advertising rates, according to the number of lines in the deception. The statement is simply a part of the system of deceit by which the Bell people have persistently sought to destroy confidence in Independent telephone investments and sweep back with this miserable broom the great flood of Independent telephony. What are the real facts in this case, which is something of an old, old, story to those familiar with the inside history of Independent telephony? The public, especially the investing public, has a right to know the truth and must look for it in a technical journal rather than in the daily newspaper.

The system of the Gallatin County, Illinois, Telephone Company was built by a banker of Shawneetown, Illinois, a man with no experience in the telephone business. This difficulty could have been obviated had he employed competent help, but from the appearance of the construction work he fell into bad hands. The system was not properly built. In September, 1903, it consisted of the following items: 60 miles of grounded toll line built of native cypress and jack oak, 30 poles to the mile, poles 20

AN ACTUAL EXAMPLE DISSECTED.

feet long and set three to four feet deep. Exchange at Ridgeway, 80 poles, 50 telephones at \$1.50 per month. Thirty farmers' telephones on five circuits at \$1.00 per year switching charges.

Fifty farmers' telephones on four circuits at \$1.00 per year switching charges. The exchange at Omaha consisting of 80 poles, 8 telephones at \$1.50 per month; 32 at \$1.00 per month. One hundred farmers' telephones on seven circuits at \$1.00 a year switching charges. This system connected with Shawneetown, the county seat of Gallatin County and with two or three other small toll stations.

The telephone business is no exception to the laws governing any other commercial proposition, a fact which the Bell people have been finding out to their cost. It must be conducted on business principles. Nowadays, at least, a telephone company must give reasonably good service in order to secure the confidence of the people and succeed, whether the company is a Bell concern or calls itself Independent. The Gallatin County company gave execrable service. This might have been expected as the man in charge of the system did not know the first rudiments of the business. He could not repair even the most simple trouble upon the switchboard or telephones. But for the fact that it covered the field exclusively, the company might have had difficulty getting any business. As if this was not enough to ruin even a stronger company, the system gave free service over the entire county with the receipts as has been mentioned. The wonder is that the concern was able to live six years.

However, six years passed and the system, poorly constructed in the first place, was ready for either rebuilding or entire abandonment. A great part of the poles were about ready to fall over and as they were only twenty feet in length at the start, they would not bear resetting. After repeated efforts the Cumberland company managed to secure a sub-license contract with the owner of this exchange. In drawing the contract an error gave the Bell people only twenty-five per cent. of the original business and the free use of the entire system for the subscribers in the exchange at Shawneetown. After considerable trouble in trying to adjust this matter and explaining to the owners that it would be impossible to operate under such an agreement, the Cumberland company pulled out its transmitters and left the plant practically isolated.

An effort was made to sell the system to the Independent people but there was nothing to sell, except sixty miles of provisional right of way. The Cumberland company bought it for \$2,000, which was at least \$1,500 more than it was worth. The property would have been dear to an Independent company at any price. THE AMERICAN TELEPHONE JOURNAL has gone into detail somewhat in describing this transaction because the case is a typical one and in describing this we describe them all. The trick has been often played by the Bell people and in all probability will be played in the future, as often as some so-called "Independent" company can be found in the proper condition of innocuous desecration. Independent telephone operators must conform to business principles or they do not deserve to succeed and one of the first of these principles is that they shall have absolutely nothing to do with a Bell concern in whatever form the temptation comes.

Fortunately Independent telephony has passed the experimental stage and has come to stay. Properly conducted Independent companies are prospering greatly and Independent securities are in demand. The growth of Independent telephony is beyond all belief.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

THE RIGHT OF EMINENT DOMAIN.

WILL you please tell me through your query page what does the right of "eminent domain" mean? I have seen this term often used in your queries and have never been able to catch exactly what it was intended to mean. C. B. M.

THE right of eminent domain has been defined as follows: "Eminent domain is the right or power of a sovereign State to appropriate private property to particular uses, for the purpose of promoting the general welfare." Lewis on Eminent Domain, sec. 1. Another definition is "the sovereign power vested in the State to take private property for public use, providing first a just compensation therefor." *Trenton Cut-Off R. Co. v. Newtown Elec. St. Ry. Co.*, 8 Penn. Dist. Rep. 549. This right is conferred in most states upon railroad, turnpike, pipe-line, telegraph and telephone companies by legislative enactment and subject to certain legislative restrictions as to method of proceeding. The reason for conferring this power upon these companies is because they are engaged in services of a public nature, such as are exercised not merely for the purpose of private gain, but for the general welfare and benefit of the community. A person engaged in such an employment becomes the voluntary servant of the public. He cannot discriminate but must serve alike all who demand the service he undertakes to render.

INDIANA LAW POINTS.

WILL you please advise through your legal column whether the rule laid down in *Magee vs. Overshiner*, 150 Ind. 127, that a telephone line in a city is not an additional servitude on the street, has ever been extended so as to include country highways, and whether a telephone company has the right of eminent domain in the State of Indiana? H. O.

SO far as the writer can ascertain the rule in *Magee v. Overshiner* has never been extended to include rural highways. The law of Indiana still remains as stated by the Supreme Court of that State in *Kincaid v. Gas Co.*, 124 Ind., 579, 24 N. E. 1067, as follows:

"There is an essential distinction between urban and suburban highways, and the rights of the abutters are much more limited in the case of urban streets than they are in the case of suburban ways. We note the distinction between the classes of public ways, and declare that the servitude in the one class is much broader than it is in the other."

Telephone companies do not appear to have the right of eminent domain in Indiana. The right does not exist unless established by express legislation and the statutes of the State do not seem to contain a law to that effect.

MORE LITIGATION IN ERIE TAX CASES.

A HEARING has been held in the Erie Telephone Company tax cases at Lowell, Mass., and the motion of the plaintiff, the collector of taxes for the city, to have the exceptions of the defendants dismissed has been granted.

It will be remembered that in 1889 the then directors of the Erie Telephone company residing in Lowell were each assessed as trustees for the Erie company, on the stock of the several sub-companies, the property of which was never taken over by the Erie company. There were in all ten directors of the Erie Telephone Company, and for some reason the stock of the sub-companies had been equally divided among these directors, seven of whom resided in Lowell. It was contended by the assessors that each of these seven directors who were Lowell residents was liable to be taxed on the stock so held by him as a "trustee" for the Erie company. The directors, on the other hand, contended that while the stock was held by them nominally, yet that

they had no interest in or actual possession of the stock, and were not liable to be assessed as trustees therefor. Each, accordingly petitioned the assessors for an abatement of the tax and one of the cases, namely, that of Charles E. Adams, was tried before commissioners, and afterwards removed by a writ of certiorari to the supreme judicial court, upon the refusal of the commissioners to abate the tax.

The hearings and proceedings in this case occupied several years, and finally, in 1895, the city solicitor of Lowell, brought suit against each of the seven defendants in the superior court for the collection of the tax. Six of the cases were tried before a jury and a verdict in each case was rendered in favor of the city. One of the cases, namely, that against Charles J. Glidden, was taken on exceptions to the supreme judicial court, and an agreement was made that the other cases should remain in abeyance until the final decision of the Glidden case. The exceptions were argued before the supreme judicial court and a decision rendered in favor of the city in the year 1900. The case was then taken on a writ of error to the United States supreme court, was argued in March last in Washington, and the decision of the United States court confirmed the decision of the Massachusetts court. Judgment was entered for the city in the Glidden case. *Glidden v. Harrington*, 189 N. S. 255, 47 L. E. 798; 179 Mass. 486, 61 N. E. 54. The motion of the plaintiff sought to have the other cases decided in accordance with the Glidden case.

The various defendants in these suits claim that if judgment is rendered against them which they are obliged to pay to the city, they are entitled to be reimbursed by the Western Telephone Company, which is the successor of the Erie company, to the extent of the money so paid. So there is likely to be, in the near future, some further litigation.

SUIT TO RESTRAIN COMBINATION.

THE Farmers' Telephone Company, of Hopedale, Ill., has sued the Pekin Telephone Company, of the same State, for injunction and other relief. The complainant's bill of complaint sets forth that the Farmers' Telephone Co. had expended \$5,000 in equipping its system in Hopedale and in building a line to Delavan. Here it connected with the Pekin Telephone Co. and through it with the Citizens' Company, of Pekin, and also with the Minier Mutual Co., thus reaching points in all parts of the county. The usual tolls were charged and everything was harmonious. Then trouble arose. The Farmers' line failed to get connections at times, it is alleged, and a combination was formed, the plaintiff claims, between the Pekin Telephone Co. and the Minier Mutual to force the Farmers to buy the Minier Company or to go out of business. It is to restrain this alleged combine that the suit is brought.

MARYLAND BILL INTRODUCED REQUIRING MEASURED SERVICE.

MR. ROTH, of Baltimore, introduced in the House of Maryland a bill requiring all telephone companies in Maryland to furnish all subscribers to a "limited service" with an electrical or mechanical device which will register and record accurately and satisfactorily to both subscribers and company each and every call such subscriber may make. The companies are given six months in which to install the registers, and may charge the subscribers a yearly rental of fifty cents. The purpose of the bill is declared to be to avoid controversies between the company and the subscribers as to the number of calls.



IN THE OPERATING FIELD.

DEMOCRATIC CONVENTION TO BE CONDUCTED TELEPHONICALLY.

THE Democratic Convention, which meets at the Coliseum in St. Louis, Mo., on July 6, is to be conducted by telephone. The committee on arrangements, at its session at the Southern Hotel, reached the decision that telephones will connect each State delegation with all the other delegations, and with the chairman's and clerks' desks. The State telephones are to be at the elbows of the leaders of State delegations, and a multitude of telephone girls will be at the switchboards to give instantaneous connections as called for. It is expected in this way much turmoil and confusion due to the chair's failure to hear a motion or to recognize speakers at exciting moments will be avoided. Each newspaper will have a telephone connected with State delegations, the chairman, the clerk and the newspaper office. Long distance telephones will be in the vestibules.

SUMMER SCHOOL FOR ARTISANS.

THE University of Wisconsin has established a summer school, the object of which is to afford a series of popular courses in technical subjects, particularly the applied sciences addressed chiefly to those whose other avocations prevent them from taking a regular college course, and particularly intended as supplementary to a correspondence course. During the last two or three years this plan has been put into effect with marked success. The session commences June 22 and ends August 4, comprising about six weeks. Sessions are held at the University in Madison and comprise courses in steam engineering, applied electricity, materials of construction, mechanical drawing and shop work. Expenses are comprised in the entrance fee of \$15, and shop fees at the rate of 5 cents per hour.

TELEPHONES HAVE MADE PEOPLE LEFT EARED.

TELEPHONES have created a race of left-eared people, and as a result the large majority of persons can hear better over a telephone with the receiver to the left ear. Nine out of every ten who use a telephone hold the receiver to that ear, and many find it impossible to hear over a telephone through their right ear. The fact that the majority of men and women are right-handed and that the constructors of the first telephones took due notice of this is responsible for this new condition of left-eared people. Watch a telephone for half a day, and it will be seen that almost every person that uses that instrument will place the receiver to the left ear. Or, even if the instrument is resting on a table, the left ear will be the one used.

When the new instruments were constructed the receivers were allowed to remain on the left side, as the users had become accustomed to this. All this has created a race of left-eared people, for, having become accustomed to using the receiver at the left ear, it was found that the hearing in that ear was better and more sensitive. Every telephone girl in the exchanges has the receiver on her left ear, and the man who uses his right ear is unusual.

WANTED—DIRECTIONS FOR MAKING A GROUND.

J. R. BORDEN, secretary of the Union Telephone Company, Plainfield, Wis., writes that his company has trouble in getting a good ground connection; that in that climate with the temperature as low as 40 degrees below zero, it finds that a rod $\frac{1}{2}$ inch in diameter and 9 feet long driven into the earth in the cellar is not sufficient to give as good a ground as is desired. The only positive ground connection that it can get is obtained by run-

ning the ground wire to a pump pipe driven to water. In some parts of that territory it is over 200 feet to water. **THE AMERICAN TELEPHONE JOURNAL** would be pleased to have any subscribers who can suggest a method whereby a good ground can be obtained under these severe weather conditions send them in for publication.

FREE TRUNK SERVICE IN SHELBY COUNTY, ILL.

MANAGER HARWOOD, of the Shelby County, Ill., Telephone Company, has taken a step that will make telephones universal in every home in Shelby County, by giving free service to all subscribers to suburban towns where there are exchanges. For instance, a person living in Shelbyville and paying \$1.50 a month for residence telephone and \$2 a month for business telephone, is entitled to call without any charge telephones in the exchanges at Brunswick, Cowden, Clarksburg, Duvall, Fancher, Findley, Herrick, Henton, Lithia Springs, Lakewood, Moweaqua, Middlesworth, Mode, Obed, Pleake, Quigley, Skates, Tower Hill, Toods Point, Windsor and Yantisville. Five minutes for one connection and three minutes' conversation is the limit.

TELEPHONE WEATHER FORECASTS.

THE weather forecast is now given by telephone to about every part of Indiana that can be reached in this way. The service has recently been extended to the extreme northern part of the State. To this section it is first sent by telegraph from Indianapolis to La Grange, and by telephone from La Grange to Shipshewana. From Shipshewana the forecast is telephoned to all patrons of the rural service centering in that town, and also to patrons of the Millersburg and Middlebury systems. Among other large towns of the State that receive this service for transmission to the patrons of the rural telephone lines are: Butlersville, Columbus (which in turn supplies eleven villages), Greensburg, Holland, Loogootee, Milligan, New Augusta, Newcastle, Owensville, Vevay, Thorntown (through which 950 subscribers are reached), and Shelbyville. Promptly at 10 o'clock each morning a call is rung simultaneously for each patron of each rural system. The operator at the exchange then announces the weather forecast to all the patrons of the line at the same time.

TELEPHONE COMPETITION AT TOPEKA, KANSAS.

COMPETITION conditions in Topeka, Kansas, have reached a novel stage. The Topeka Independent Telephone Company there now has over 2,300 subscribers, which number is on the steady increase. The Bell Company is allowing very many instruments to remain in service without charge, and those in a position to speak knowingly say that it is doubtful if it has over 500 paying telephones in the city. Recently the Monopoly Company forgave a nine months' account for two telephones for the privilege of the quarter just beginning, and in another instance an account for six months for one telephone was overlooked, the conditions being the same as in the previous case.

LONDON-NEW YORK TELEPHONE FIGURES.

AT a recent meeting of the National Telephone Company in London the chief engineer of that company, Mr. Gaine, made some interesting comparisons between the telephone systems of New York and London, among which he stated the following comparisons:

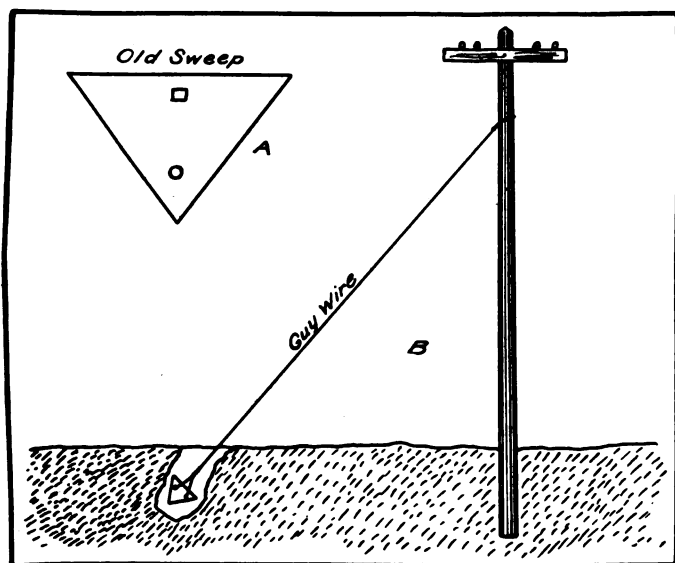
"The telephone area of London covers 640 square miles, and has

a population of about 6,500,000. Greater New York (which includes New York City, Brooklyn, Jersey City, Newark, Long Island, and suburban districts) covers an area of about 400 square miles, with a population of 4,000,000. In London the company has about 65,000 lines, while the Postmaster-General recently stated that the Post Office had 15,000, making together 80,000. In Greater New York the number is upward of 200,000. In Manhattan Island alone, which constitutes the center of New York, and which had an area of about 21 square miles and was about equivalent to the area covered by the City, Westminster, and Kensington, there are upward of 110,000 lines working.

After concluding his report, Mr. Gaine stated that in his opinion the National Telephone Company could easily increase their subscribers faster than it would be practical for them to obtain facilities with which to afford service, and during the next two or three years, it would be necessary to spend in the neighborhood of £10,000 in providing adequate facilities for London.

A CHEAP GUY PLATE.

IN some parts of the country where farm lines are prevalent the builders of them have found that worn-out sweeps from cultivators make good guy plates. A wire is put through holes as shown in the drawing, and the sweep is set four or five



feet in the ground. Of the two holes shown in the drawing through which the guy wire is run, one will be found already in the sweep and the other has to be made. *A* in the figure shows the sweep, and *B* shows it set in the ground and the way the wire is attached to it. They average about 14 inches wide and run from 8 to 36 inches in width. There are parts of old ploughs which also answer well the purposes of guy plates. Either of the mentioned pieces of metal can usually be had for the asking of any farmer who possesses them.

NEW YORK SUBWAY FIRE DISABLES MANY TELEPHONES.

BY a recent fire in the Rapid Transit subway at Fulton street and Broadway, New York City, 3,000 telephones were put out of commission.

J. J. Carty, chief engineer of the telephone company, said that the damage would amount to about \$10,000. In the Cortlandt street exchange where about 150 operators were employed, a dramatic scene occurred at the moment when the telephone wires were melted away and fused by the fire. Chief Engineer Carty described it as follows: "The fusing of the wires had the same effect as the simultaneous calling up of the central office by nearly all the subscribers in the section would have had. In a moment about 5,000 lights, which are used here in place of bells, gleamed up.

"Only the Cortlandt street section of the local service is affected but the long-distance communication with Boston, Buffalo, New

Haven, and Providence, and probably with neighboring sections was temporarily destroyed. The construction of the subway at this point necessitated the removal of the conduits. To protect the cables from injury they were wrapped with burlaps and the report is that in making repairs to a splice the burlap caught fire from an explosion of a gasoline torch and quickly melted the lead sheathing of the cables burning out the paper insulation.

A FORTY DOLLAR TELEPHONE CONVERSATION.

UNTIL he had deposited \$40 in the slot a man held the wire of the long distance telephone from the Senate at Washington, D. C., to New York the other day, while another man and a handsomely dressed woman made trips to the Supreme Court to watch for a report of the decision in the Northern Securities case. The value of hearing the result on the minute appeared to be supreme to the mysterious group and their New York correspondent. Although a number of Senators wanted the New York wire and stood around impatiently waiting for a chance the New Yorker sat unconcerned at the telephone and discussed the quotations on various stocks and certain personal matters in a loud tone with the person on the other end of the wire in New York. The New York rate is sixty-five cents for the first three minutes and twenty cents for each succeeding minute. The man at the telephone had a large pile of change in front of him, and at the end of every minute dropped twenty cents into the slot, thus holding the wire continuously for more than three hours.

NORTH DAKOTA TELEPHONE AND ELECTRICAL CONVENTION.

A CONVENTION of men engaged in the electrical and telephone business in North Dakota is to be held in Grand Forks, May 11 and 12. The following call has been sent out from Rugby:

"Will all who are interested in electric light plants and telephone exchanges, either as owners or part owners, superintendents of the same, managers, electrical engineers, members of city councils where cities are owners of plants, in the State of North Dakota, meet at Grand Forks May 11th and 12th, for the purpose of forming a State organization? An invitation is extended to all who are members of like organizations in other States."

FAIRBANKS TELEPHONE AMENDMENT RULED OUT OF ORDER.

THERE is universal regret throughout Indiana, because of the announcement that Senator Fairbanks' amendment to the post-office appropriation bill, appropriating \$20,000 for experiments in rural free telephone delivery service was ruled out of order. Mr. Fairbanks made a strong argument in favor of the amendment, citing many incidents of the character of the service having already been carried out in Indiana. The senators who opposed it based their opposition on the ground that in time such service would increase the cost so enormously that it could not be maintained. Senator Fairbanks thinks the objections are not tenable and says he will venture the prediction that such a service will be ultimately inaugurated.

MEXICO, MISSOURI, TELEPHONE MEETING.

IT has been announced that a meeting of the managers of all the telephone lines of Audrain and adjoining counties in Missouri will be held in Mexico, Mo., on Saturday, April 2. It is expected that there will be a productive convention and that there will be a full attendance.

THE TELEPHONE MAINTAINS HIGH PRICES.

EGGS are high in Indiana. Claton B. Hunt, one of the oldest and largest produce dealers of Indiana, gives part of the credit to the telephone for the better prices farmers now receive for eggs and other farm products. He says: "When a huckster drives his wagon up to the home of a farmer and offers a price the farmer need not take the huckster's word. He steps to the telephone, calls up the town dealer, learns the price and sells his produce without fear of being beaten."

TELEPHONE



PATENTS

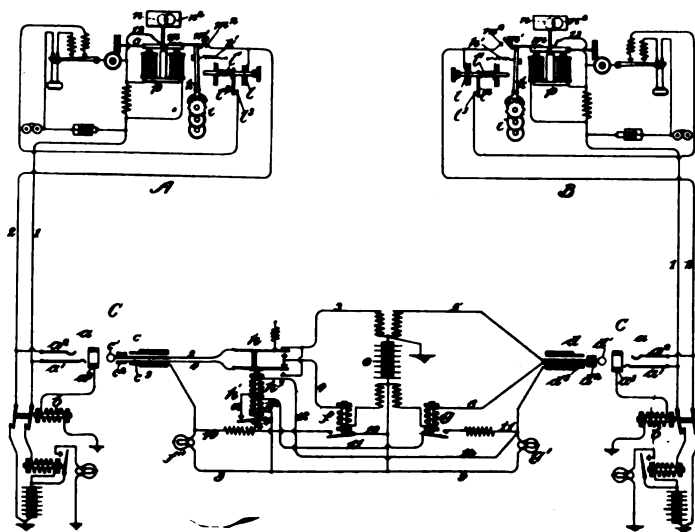
SERVICE METER FOR TELEPHONE LINE.

F. R. McBerty, Evanston, Ill., patents (No. 755,308) and assigns to the Western Electric Company, of Chicago, Ill., an improved service meter for telephone lines. The essential features comprise a mechanism for recording the number of calls, an arrangement whereby it is impractical for the subscriber to talk unless he has recorded his call, and means whereby the failure of the operator to obtain the called party will prevent a tally. In the accompanying figure *A* and *B* are the sub-stations connected to the central office by the lines 1 and 2. The sub-station apparatus is of the familiar common battery condenser type, to which is added an electromagnet *p*, a register *i*, and a push button *l*. At the central office the apparatus is of the usual relay

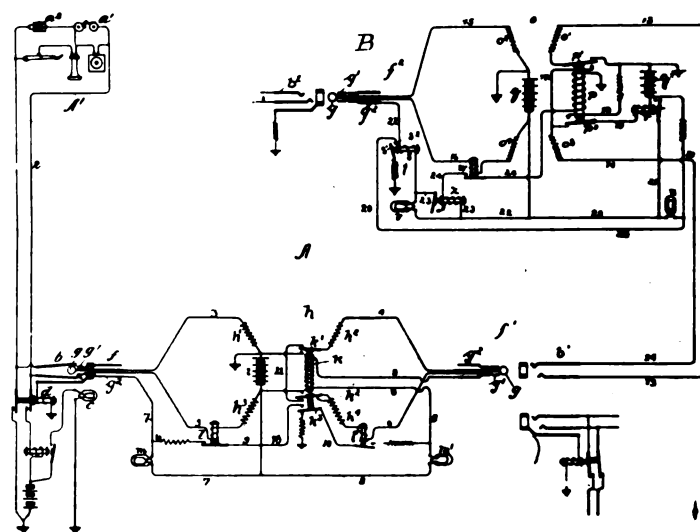
a clockwise direction. Two things result: A short circuit 13 is closed about the telephone apparatus and thus the subscriber is prevented from talking. Second, it moves the target *n* before the opening *n2*, thus notifying the subscriber that the called party has answered and that in order to talk, he must press the push button *l*, which, when pressed, operates the lever *k*, causing the counting mechanism to record and, at the same time, releases the catch *m'* from its contact *m2*, breaking the short circuit 13 and permitting the use of the telephone.

IMPROVED TRUNK LINE SYSTEM.

E. H. Smythe, Freeport, Ill., patents (No. 753,927) and assigns to the Western Electric Company, of Chicago, an improved



board type, excepting that on the answering plug side of the cord circuit a special magnet *h'* is added. Assume sub-station *A* to call, the subscriber removes the receiver, illuminating the signal lamp. The operator inserts the answering plug *C* into jack *a* operating cut-off relay and extinguishing line signal. Then battery *e* flows over the line, exciting supervisory relay *f* and shunting out supervisory lamp *f'*. The polarized magnet *k* is included in the line circuit, the sub-station *A*, and receives current in such a manner as to tip the armature *m* in a counter clockwise direction, thereby actuating the lever *k* of the counting mechanism, which is thrown over by the spring *k'* and affects half of the registration. Upon receiving the order the operator inserts the connecting plug *d* into the spring jack *a* of the desired line and rings. When the called subscriber removes the receiver, the supervisory relay *g* is excited extinguishing the supervisory lamp *g'*. It will be noticed that the armature of the relay *g* is connected through one of the windings of the magnet *h'*, therefore the armature of this magnet controls two contacts on the cord strands 3 and 4. Normally these contacts are closed in the upper position, but as soon as the relay *h'* is excited the armature *h* is drawn downwards and the direction of the battery current through the calling subscriber's line reversed. Therefore as soon as the called subscriber has removed his telephone, the closure of the armature relay *g* excites the relay *h'*, and accomplishes two functions, one that of drawing the armature *h* downwards and reversing the current over the calling subscriber's lines, and the other that of closing the armature *h4*. The closure of the armature *h4* completes circuit 12, which includes the winding *h3*. Thereby the magnet is continuously excited so long as plug *d* remains in the spring jack of the called line. The operation of the magnet *h'* reverses the current through the polarized magnet *p* at the sub-station, causes the armature *m* of the relay to tip in



trunk line circuit. The object of this invention is to provide a trunk line circuit which, when not in use for conversation, can be used for transmitting signals and that when conversation is in progress the line will be entirely freed from grounds. This invention is shown in the figure. The circuit is intended to be operated upon reverse call circuit system in the ordinary manner, and is best understood by describing operation. The removal of the telephone at *A'* lights the line signal lamp *C* in the office *A*. The operator inserts plug *f* into the spring jack *b*. Then current flows from battery *i* windings *h'* and *h3* of the repeating coil via conductors 3 and 5, through the relay *l*, which closes shunt 9 and extinguishes the supervisory lamp *m*. If, on receipt of order, the party called for is in the same office the operator would complete the connection in the usual manner, but assuming party desired to be in office *B*, operator obtains the trunk over the call wire from the *B* operator in the usual manner. Upon the designation of the trunk, the *A* operator inserts the connecting plug into spring jack *b'* of the line designated. The trunk operator at *B* taking the plug *f2* tests the spring jack of the party called for, and if not busy inserts it and rings. The insertion of this plug completes a local circuit from battery *q* through wire 22, lamp *v*, relay *s*, sleeve *g2* of plug *f2*, contact ring of jack *b2* and to ground. Relay *s* closes contacts *s'*, *s2* completes circuit from battery *q*, through conductor 20, clearing out signal *u* which is subject to the control of the plug *f'* and spring jack *b'*; the insertion of *f'* into jack *b'* connects conductors 4 and 6 with conductors 13 and 14, extending the circuit from the calling station to the terminal plug *f2* and thence to the station called for. There is no circuit from the third contact of spring jack *b'* so that the local circuit of plug *f'* remains open and relay *k* unexcited. Conductors 4 and 6 have a path through windings *h2* and *h4* and wire 11 while wire 10 goes to earth through a

resistance coil providing a path for current from battery *i* through conductors 8 and 10 and signal lamp *m'*, this circuit being controlled by the switch contacts of the supervisory *l'*. This removes all grounds from the trunk line, the lamp *m'* is lighted by battery *q*. When the called party answers there is circuit from battery *q*, exciting the supervisory relay *w*, closing the switch contacts of relay *w* and giving circuit from battery *q* by conductors 22, 23 and 24, including magnets *p* and *x*. Relay *x* closes the shunt about signal lamp *v*. Relay *p* severs the connection of conductors 13 and 14 with battery *q'* and connects these through wire 17, opening connection between wire 18 and 14 and uniting wires 18 and 19, making a local circuit with magnet *r*. This relay remains excited and extinguishes the clearing-out lamp *u*. The response of the called party thus frees the trunk line from all grounds and supervision is assigned to the subscriber's operator at the office *A*.

RINGING AND LISTENING KEY.

C. H. North, Cleveland, Ohio, patents (No. 754,935) and assigns to the North Electric Company an improved ringing and listening key. This key is of the vertical type and consists of a face plate to be secured to the operator's cord shelf that carries a double set of springs inserted in an insulating block, secured to the base of the key. The face plate also carries a handle supporting two rollers that actuate the springs.

IMPROVED CABLE CLIP.

J. McFarlane, of Allegheny, Pa., patents (No. 754,884) an improved cable clip. This consists of a strip of zinc cut in such a manner that it may be passed around the cable, the ends curled up to drop over the messenger.

PARTY LINE SYSTEM.

Robert Hamilton, Milton, Mass., patents (No. 755,868) an improved party line system. The object of this invention is to pro-

vide a party line system which shall be selective and secret, which the inventor accomplishes by providing a locking mechanism at the sub-station consisting in a pin inserted in a commutator wheel which is operated by a pulsating current. This pin locks each station which is not called.

TELEPHONE SELECTIVE SYSTEM.

Noble S. McKinsey and Anton R. Nelson, of Susanville, Cal., patent (No. 755,691) an improved method of party line signaling. This is a method based upon a step by step mechanism which operates a commutator at the sub-station. It is so intricate that the reader is referred to the complete patent for the proper comprehension of it.

LINE WIRE CLAMP.

H. C. Willitz, Zanesville, Wis., patents (No. 755,092) an improved wire clamp. This is a device to connect together two wires of different sizes, and consists in a thin metallic strip folded over to form a spring, between which the two wires are inserted.

TELEPHONE CALL ATTACHMENT.

J. J. Nye, Brookfield, Vt., patents (No. 756,183) an improved telephone call attachment. This patent covers the attachment to the bell of each sub-station and a kind of speaking tube, which may extend to an adjoining apartment and thus convey the sound of the ringer to any point desired. The same arrangement may be applied either to the receiver or transmitter.

TELEPHONE CABINET.

W. B. Altick, Lancaster, Pa., patents (No. 756,091) an improved telephone cabinet. The object of this invention is to provide a cabinet surrounding the sub-station which may or may not be used at pleasure. It consists in a semi-circular enclosure, something like the lid of a roll top desk, which may be unfolded in such a manner as to enclose the sub-station.

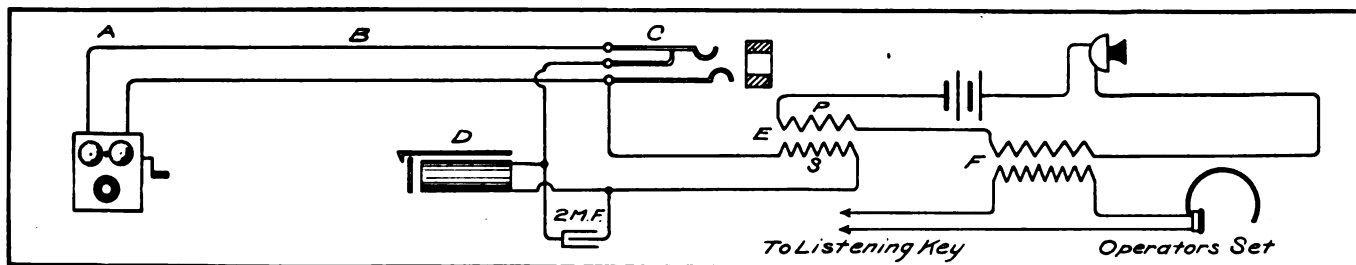
A MANAGER'S MONITORING CIRCUIT

By E. MILLER.

ONE of the problems in a small or medium size exchange is the maintaining of discipline among the operators. During the day, when the chief operator is on duty and the manager nearby, this is an easy matter, but when these officials are not in the office there is apt to be noise and sometimes work is neglected, especially during the evening, when the board is not busy.

The following circuit is a simple and effective way to secure

The listening-in is absolutely secret; the operator can in no way tell when you are on her circuit. *A*, *B* and *C* are respectively the residence telephone line and switchboard jack, *D* is the line drop shunted by a 2 m. f. condenser. In series with the line drop is the secondary of an induction coil *E*, the primary winding of which is in series with the primary, battery and transmitter of the operator's set *F*. The condenser is in shunt with the line drop and allows the talking circuit a free pathway. The line



an orderly operating room. It consists of a supervisory monitor applied to any one of the operator's sets, whereby all that goes on in the room can be plainly heard at some distant point. In this case the listening circuit is applied to the manager's residence line, and by it he can overhear every sound at the exchange half a mile away. It is not intended as a spying system, but rather as a check on the operators. They all know of it, and this knowledge keeps them quiet, careful of what they say, maintains better order and improves service.

The circuit is attached to an active operator's set. While she is answering calls, as long as her key is open, one can overhear her and also the subscriber to whom she is talking. Whether her key be open or closed, every word spoken by all or any of the operators can be clearly heard at the manager's residence.

to the residence can be used in the ordinary way. As soon as the operator plugs in to answer or to ring the monitor is cut out. The telephone is a bridged instrument, 1,600 ohm ringers, and line is metallic circuit.

TELEPHONY IN FAR OFF AFRICA.

LIEUT. HUSSEY, U. S. N., was recently detailed to visit officially, King Menelik of Abyssinia, for the purpose of inviting him to the St. Louis Exposition. The sovereign was kept informed of the visiting party's movements by means of the telephone system which is in existence in that far away kingdom. It is said that living trees are used for poles and that the line, though a very long one, has a ground return.



THE WEEK'S MESSAGES

FINANCIAL

ARCOLA, ILL.—The Arcola Grain, Coal & Telephone Company has increased its capital stock from \$5,000 to \$8,000.

JASPER, IND.—The Velpen, Ireland and Otwell Telephone Company has decided to sell its plant to the Dubois County Telephone Company at Huntingburg.

GREENFIELD, IND.—The Blue Ridge Telephone Company of Hancock County has increased its capital stock to four times its original amount, although the company is only a little over a year old. The demands for telephones became so numerous that the increase was made necessary. The company has a rural system in Blue Ridge Township.

ALBANY, OHIO.—The Albany and Vales Mill Telephone Company has decreased its capital stock from \$10,000 to \$1,000. J. Q. A. Vale is president.

PHILADELPHIA, PA.—The Keystone Telephone Company makes the following comparative report of its net earnings for the quarter ending March 31: 1904, \$78,910; 1903, \$41,318. An official of the company says: "If the report for the quarter ending December 31, 1904, shows as large a comparative increase over the previous December report as the last report shows over the first quarter for 1903, the company should be in a position to pay full dividends on the common stock next year."

BLACK RIVER FALLS, WIS.—The Central Wisconsin Telephone Company of this place has increased its capital stock from \$5,000 to \$50,000. H. A. Bright is president, and Edwin A. Miller secretary.

PRESTON, WIS.—The capital stock of the Annaton-Preston Telephone Company will be increased from \$6,000 to \$9,000 or \$12,000.

FRANCHISES.

LOS ANGELES, CAL.—The Home Telephone Company will be granted a franchise at Ormand.

CHENEY, WASH.—The Board of County Commissioners has granted a franchise to the Cheney and Spangle Mutual Telephone Company to construct a line from Spangle to Cheney. The officers of the company are Math. Ludwig, president; Ed. Thompson, secretary, and Sol Lind, treasurer.

ATHENS, ILL.—The city council has granted a franchise to the Manard County Telephone Company, of which Lee Kincaid and W. C. Scott are the principal organizers. A line will be built at an early date.

INDIANAPOLIS, IND.—The Queen City Telephone Company, composed of Harry B. Gates and others of Indianapolis, expects to get a franchise in Cincinnati. The Suburban Telephone Company and the city opposed it, and the case was brought into court when Judge Carl Nippert of the Hamilton County Probate Court of Ohio decided in Mr. Gates's favor.

INDIANAPOLIS, IND.—The city council at a special meeting passed an ordinance permitting the New Telephone Company to transfer its franchise and holdings to the Indianapolis Telephone Company. The transfer will in no wise affect the franchise rights or impair obligations. The company is now paying the city \$6,000 a year, and the franchise provides that the company shall pay the city \$2 per annum for each telephone over 6,000. The increase of capital and the increase of 2,000 telephones will bring the income to the city up to \$10,000 a year, as the 6,000 mark has already been passed.

CENTREVILLE, IA.—By a vote of 4 to 1 the Farmers' Telephone Company was granted a franchise.

LE MARS, IA.—The Le Mars Telephone Company has been granted a franchise at Struble.

BUNKER HILL, KAS.—The Bunker Hill Telephone Company has been granted a franchise for a local telephone system, and will begin construction work at once.

MENOMINEE, MICH.—George Bisbee, representing the Chicago Automatic Telephone Company, is here and will ask for a franchise. He will also ask for a franchise in Marinette.

COTTONWOOD, MINN.—The city council has granted an exclusive 30-year franchise to the Home Telephone Company.

LOUISVILLE, NEB.—The Mutual Telephone Company, recently organized, has been granted a franchise here. The officers are: Will Schaal, president; Dan Phelps, vice-president; J. H. Sundry, secretary, and Zach. Jarman, treasurer.

BRYAN, TEX.—The city council has granted a franchise to H. B. Dorsey to construct and operate a telephone system.

OMAHA, NEB.—At a monthly meeting of the Council Bluffs Commercial Club a resolution was passed "encouraging the granting of a franchise to an independent telephone company."

HAMILTON, OHIO.—The Hamilton Home Telephone Company has been granted a franchise by the village council of Somerville.

EVERETT, WASH.—The Skagit Farmers' Mutual Telephone Company will apply at once to the City Council for a 50-year franchise to construct an operators' system in Everett.

ELECTIONS

RUSHVILLE, IND.—The annual meeting of the Rushville Co-operative Telephone Company was held on the 9th inst. The secretary-treasurer's report showed the receipts for the year to be \$15,404.91. Rentals were increased to \$1 for residences and \$1.50 for business houses. H. E. Barrett, W. D. Root, F. M. Green and B. L. McFarlan were elected directors.

PLYMOUTH, ME.—The Plymouth Telephone Company has elected A. O. Ward, president; W. G. Loud, secretary and treasurer; M. J. Dow, general manager. The line will be extended from Plymouth to Troy and one to Detroit.

AITKIN, MINN.—The Aitkin-Grand Rapids Telephone Company has elected I. Chute, president; C. C. Sutton, vice-president; C. D. Chute, secretary; Carl J. Anderson, treasurer.

ITHACA, N. Y.—The Ithaca Telephone Company has elected B. G. Hubbell, president; M. Van Cleef, vice-president; H. L. Hinckley, treasurer and Charles H. Blood, secretary.

COMBINATIONS

WATERBURY, CONN.—The Waterbury Automatic Telephone Company has been sold to a syndicate of Woodbury capitalists, with Judge Arthur D. Warner, of Woodbury, president of the new company. The company was organized in 1899, but has never been engaged in active business.

SPARTA, MICH.—The Citizens' Telephone Company of Grand Rapids, has purchased the Sparta Telephone Company, and will begin at once to overhaul the lines, put the exchange in first-class order and extend rural lines.

PELICAN RAPIDS, MINN.—The newly incorporated Pelican Telephone Company has purchased the Pelican Rapids exchange from the Fergus Telephone Company, including rural lines to Norwegian Road, Center Grove and Stod.

CARTHAGE, MO.—Messrs. Berry & Hendricks of Carthage have purchased from Dr. J. A. Young his telephone system covering Hancock County, Iowa.

SELLERS, MO.—J. R. Sellers, of this place, has purchased a telephone line which connects Sellers and Gilead, a distance of about six miles.

DUSHORE, PA.—The Wyoming and Sullivan County Telephone Company and the Farmers' Telephone Company have consolidated under the name of the former and have elected the following officers: Thomas Hope, president; C. F. Hunsinger, vice-president; C. S. Vaughn, secretary and treasurer.

PERSONAL

W. A. ALTERSON, of Zanesville, Ohio, has been appointed manager of the Newark (Ohio) Bell Telephone Exchange, succeeding Mr. J. T. Daniels. Mr. Daniels has been promoted and will be in the future located at Columbus.

C. J. BENJAMIN has been appointed manager of the telephone exchange at Norwich, Conn., succeeding E. W. Abbott. Mr. Benjamin has been in the general office at New Haven.

J. GRATZ BROWN has resigned his position in the right-of-way department of the United Telephone Company of Pennsylvania, and will hereafter represent the Consolidated Adjustment Company of Chicago as General Agent, with headquarters in New York City.

MR. ELLWOOD MATEER has been appointed manager of the Pennsylvania Telephone Company at Lock Haven and Renovo, Pa.

CHARLES L. POLAND, former superintendent of construction with the Hamilton County, Iowa, Independent Telephone Company, has resigned his position. He expects to remain in Webster City. The Independent company has not elected Mr. Poland's successor.

MISS MARIE SAULT, who has been the local manager at South Manchester for the Southern New England Telephone Company, resigned April 1. The resignation was accepted and Miss Alice Sault, her sister, who has done most of the work in the office, was appointed her successor.

CAPTAIN GEORGE SHAW, who has been the local manager of the Interstate Telephone Company at Prophetstown, Ill., for several years, has resigned the position, and the place will be filled by C. L. Lawrence of Batavia.

EMOR ARMINGTON SMITH, who succeeded George A. French as manager of the Hartford, Conn., office of the Southern New England Telephone Company, has been in the employ of the company in various capacities for over nineteen years. Mr. Smith was born in Providence, R. I., August 17, 1864.

H. H. SMITH, of Memphis, Tenn., the new manager of the Independent Telephone Company at Temple, Texas, has taken charge of the exchange at that place. Mr. Smith was formerly special agent for the Independent company at Memphis.

STEVENSON WARD has been appointed general manager of the Mansfield, Ohio, Telephone Company.

C. E. STINSON, formerly of the Rochester, N. Y., and Memphis, Tenn., Telephone Companies, has been appointed general manager of the Toledo (Ohio) Home Telephone Company.

MISCELLANEOUS

DALEVILLE, IND.—The Daleville Home Telephone Company's exchange is to be operated for long-distance messages and will give rural service to the farmers near Daleville and Chesterfield. Grant Isonogel, of Yorktown, is president; Richard C. Stone, Muncie, vice-president; H. Forrest, Daleville, secretary.

INDIANAPOLIS, IND.—In a special session the city council passed the ordinance permitting the New Telephone Company to transfer its franchise and holdings to the Indianapolis Telephone Company. The committee on franchises and contracts reported favorably in the matter.

RUSHVILLE, IND.—The stockholders of the Rushville Co-operative Telephone Company, 204 in number, met April 9, and decided to reject all offers of outside parties to buy the plant. The company has a considerable debt and needs many improvements, and it was decided to meet all exigencies. Each stockholder will be assessed an amount equal to 50 per cent. of his holding. The number of shares of stock will be doubled.

NORBORNE, MO.—The Norborne Telephone Company, which commenced giving service in December of 1900, now has 350 subscribers. The capital stock of the company is \$15,000, and its rates for service are \$2 a month for business and \$1 a month for resident telephones. The Bell company has no exchange or no subscribers in the territory. The officers of

the Norborne Company are N. P. Evans, president; Minnie Evans, vice-president; Newlan Conkling, secretary, and N. P. Evans, treasurer and manager.

BUFFALO, N. Y.—The Inter-Ocean Telephone and Telegraph Company, of this city, reports an increase in long distance business. The lines of the Inter-Ocean company are being rapidly extended in Western New York State. It is now connected with at least five hundred towns and over fifty thousand subscribers.

OBITUARY

M. V. Sanders, foreman of the Central Telephone Company, of Decatur, was killed April 5th by a live wire.

RATES

INDEPENDENCE, MO.—The Home Telephone Company has opened up its toll line between this city and Kansas City, and the telephone service, which has been free to this time, will now be charged for. There has been no cut in the toll charge, but it is expected a 5-cent toll will be charged to Kansas City instead of a 10-cent toll.

UNDERGROUND

GREEN BAY, WIS.—The Wisconsin Telephone Company is preparing to install underground conduits here.

CONSTRUCTION

THOMASVILLE, ALA.—The Thomasville Telephone Company has just completed the installation of a 50 subscriber exchange at this place.

CARBONDALE, ILL.—The Farmers' League and Community Telephone Association is preparing for the construction of its system. The capital stock is now all paid up. Exchanges will be put in at Carbondale, where a franchise has been secured, and also at Murphysboro, Mecanda and other towns.

GREEN VALLEY, ILL.—Levin Hyneman, manager of the Home Telephone Company, is remodelling the lines of his company. A long-distance line is to be put in between Lexington and Chenoa. A new mutual company has been formed to operate a line north of the Valley. Work on the line will commence soon.

PULASKI, ILL.—The Mutual Telephone Company is planning the construction of a new exchange building.

ELKHART, IND.—The Home Telephone Company of Elkhart, Ind., has received 14,000 feet of additional cable. This will admit of the installing of many new telephones.

FOREST, IND.—The Forest Telephone Company expects to construct a line to Frankfort.

KIRKLIN, IND.—More than 50 shares of stock have been subscribed toward a co-operative telephone system at this place.

ROANN, IND.—The Roann Telephone Company is making extensive preparations to enlarge its plant. Dan Van Buskirk, W. S. Berry and R. Miller are now associated with the company.

AMES, IOWA.—The Boone County Mutual Telephone Company is making a number of substantial improvements on its lines in this city and the rural lines in this vicinity. It has recently come into possession of the rural lines heretofore owned and controlled by the Iowa line near Ames, and arrangements have been completed to connect forty-six farmers with the exchange at Ames.

ELBERON, IOWA.—Another Farmers' Rural Telephone line will be built into Elberon from the northwest, running from the German settlement in Benton County.

DOWNS, KANS.—The Downs-Western Telephone Company expects to rebuild about 50 miles of toll lines this spring. The company's business is so

heavy that they will have from two to four circuits on their toll lines instead of one, as at present.

OVERLIN, KANS.—J. H. Young, manager of the Central States Telephone Company, of this place, says that his company has material on hand to build at least 100 miles of toll line, and expects to commence construction work at once.

PORTIS, KANS.—Farmers living in the vicinity of Portis are constructing a rural telephone line along the mail routes. They will install a central office here. Between 200 and 300 telephones will be connected with this office.

STOCKTON, KANS.—The Stockton Telephone Company will rebuild its system this spring and will install a new 300-line switchboard.

DETROIT, MICH.—T. F. Ahearn, of this city, who built the Detroit Telephone Company's plant, has been consulting recently with capitalists who are preparing to incorporate a new Independent telephone company for Detroit.

JANESVILLE, MICH.—A meeting was held here recently and it was decided to construct a telephone line to Hillsdale and Allen. I. I. Wickes is president; A. H. Dudley, secretary, and William Merchant, treasurer of the new line.

HALLOCK, MINN.—The Farmers' Telephone Company will be constructed from Hallock to Drayton.

WINONA, MINN.—With the advent of spring weather the Winona Telephone Company will begin the construction of several new lines in different parts of Winona County. An extension that will be put in early will be in the towns of Wilson and Wiscov. Those who have already signed to install telephones along this line include Philip Kammerer, H. Howell, Joseph Rowekamp, Henry Lambrecht, Jacob Redig, Ezab Vier, J. E. Blach, A. Rowe-kamp, Rudolph Belter, Fred Haedtke, Herman Roloff, John Thill, John R. Gahnz, Thomas Lynch, John Marouchek, Wm. Harvey, R. E. Marsh, Frank Gernes, Fred Dobblesstein, John Worniken, Fred Oech, John A. Lafky, W. Hueblein, Herman Ohm, Charles Elfmann, John C. Ehlers, George Chappell, Julius Hoppe, Andrew Rouse, L. Berg, Gustave Hornberg, Albert Stenck, W. F. Todd and T. Hicks.

ARGENTINE, MO.—The Kaw Valley Telephone Company, operating in Wyandotte County, has secured permission from the Board of Commissioners of Wyandotte County to string wires across the Kaw River at Turner.

MAYWOOD, MO.—The Citizens' Telephone Company of North Missouri will hold a meeting in the near future to decide what work shall be done at its office. Among the work contemplated is the installation of a new switchboard and the construction of a line from here to La Grange.

SELLERS, MO.—The Lewis County Telephone Company, with main office at Canton, Mo., will install a new switchboard for the local exchange.

BIG TIMBER, MONT.—E. Arneson and John Davis, wealthy ranchmen, living along Swamp Creek, have started the movement toward the organization to connect all the ranches from Melville to Big Timber, with an exchange at Big Timber.

SWEDESBORO, N. J.—The People's Rural Telephone Company will construct a line from here to Millica Hill.

COLUMBIANA, OHIO.—The Fairfield Township Mutual Telephone Company was given a contract for the construction of a new telephone line south of Columbiana to E. J. Longanecker.

OMEGA, OHIO.—E. Humphry, president of the Home Telephone Company of this place, was at Manchester recently arranging for establishing an exchange at that place.

SPRINGFIELD, OHIO.—The Home Telephone Company is planning a construction of 200 miles of additional farmers' telephone lines.

WEST MILLGROVE, OHIO.—Farmers living in this vicinity and citizens of this place will construct a local Independent telephone system.

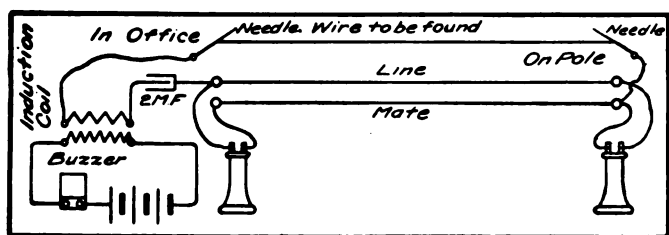
PITTSBURG, PA.—The Pittsburgh and Allegheny Telephone Company is planning the erection of a brick office in the West, in which it will install a new exchange.

SAN ANTONIO, TEX.—D. A. Walker, secretary and manager of the San Antonio Telephone Company, is arranging for a number of improvements the company has decided upon.

A TONE TEST

By F. C. GREENWALD.

IN testing cable in order to locate pairs, the first operation necessary is to obtain a "talking pair," over which to establish communication between parties. The usual method is to have the man at distant end connect to the "line" wire of any pair with one terminal of his receiver and to ground the other terminal on



the cable sheathing. The man in the exchange grounds one terminal of his receiver and connects to one side of two or three dry cells in series, the other terminal. With the free battery terminal he taps on all wires of the cable, one at a time, until he notices a click in his head telephone, which indicates to both men that the wire has been located to which the man on the pole has attached. They then communicate and take both wires of the pair and establish a metallic talking circuit. After obtaining the circuit through the cable pair and both head telephones, one of the testers connects a cord terminating in the usual needle to one or

the other wire of the pair. The other tester at his end attaches the condenser, secondary of induction coil and needle cord—all in series—to the opposite wire. The battery, a low wound buzzer and primary of the induction coil, are then connected in series when the buzzer will immediately begin to work. The arrangement of apparatus is shown in the accompanying diagram.

The tester at distant end attaches with his needle to any wire the arrangement of which inside the office he may wish to know. The tester in office then "feels" for him over all wires inside until both are notified the wire has been "picked up" by the man inside. It is evident from the figure that when both men touch the ends of the same wires with their needles, the secondary circuit of the induction coil is completed through: the condenser, the wire found, and head telephones of both testers, all in series. When circuit is thus completed both parties hear in their receivers a loud hum or tone. The tester in the office then removes his needle from the wire and tells his companion on the pole how the wire is placed inside, so that he may arrange it similarly at the outside end; that is, he will give it the same number in the outside cable head. The condenser is used so that in central energy exchanges false signals will not be shown on the switchboard should the men be testing on a cable connected through to the exchange. Should the cablemen get the tone on more than one wire or by moving the needle, so as to touch the cable sheathing, a cross or ground, respectively, would be indicated.

BOOK NOTICES

Any book herein reviewed will be sent postpaid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

THE ELECTRICAL MAGAZINE published by The Electrical Publishing Co., Ltd., 4 Southampton Row, Holborn, London, W. C., England. Edited by Theodore Feilden. Price 6 pence. Monthly.

This periodical is the latest addition to the ever widening circle of technical literature, and, judging from the first two numbers, which lie upon our desk, the newcomer, if it in the future fulfills the promises of the present, will be an exceedingly welcome addition. *The Electrical Magazine* will be published the third week of every month, the editors having selected this date, as it thereby enables them to present the freshest possible matter. Each number contains a series of terse, carefully prepared articles on current electrical subjects, thoroughly illustrated. In addition, the departmental feature is unusually thoroughly carefully worked out. Each number commences with an editorial review of progress of the preceding month; then there is quite a complete illustrated abstract of electrical patents and specifications. A digest of current electrical literature, a department for the electro-mechanical student, a review of trade literature, and a section upon electrical finance and legislation. There is also a department which will be devoted to Telephony and Telegraphy, which is a welcome feature, as the English journals have given, in the past, these branches their just share of attention. The typographical features are equally commendable as the numbers are printed upon excellent paper, fully illustrated by well-prepared half-tones. Naturally, as an English periodical, its interests are largely British, but the American electrical reader who desires to keep in touch with the developments abroad will do well to obtain this magazine as a source of information.

TRADE NOTES

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, N. Y., has recently closed a contract with the Warner Telephone Company, of Gowanda, N. Y., for the entire building of its new plant. The contract includes the outside plant construction, central station equipment and sub-station instruments; also calls for a complete common battery system of the latest design.

THE COLUMBIA ELECTRIC COMPANY, the offices and factory of which are at McCordsville, Ind., is offering a new self-contained switchboard drop, which, it is said is having a wide sale. The drop is so built that it is interchangeable with switchboard drops of certain other makes. The Columbia desk set is also made by the concern, and is a very neat, well-appearing instrument, built in the severe lines that are now so popular.

THE INDIANA RUBBER AND INSULATED WIRE COMPANY, of Jonesboro, Ind., has just finished the shipment of four orders to foreign countries. The first order was for 200,000 feet of telephone cable, which was shipped to Yokohama, Japan. The second was for one ton of rubber tape, shipped to Alexandria, Egypt; the third, one ton of tape to Berlin, Germany; the fourth, one ton of tape to Paris, France. Another order has been received from a firm in Paris for one ton of tape, which will be shipped in a few days.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, is receiving a large call for its new "never failing" self-restoring drop, not only for complete switchboards for new exchanges and re-equipping plants, but it is also having a constantly increasing demand for extending boards of other makes. Its combination jack and self-restoring drop are arranged in strips of five and can readily be mounted on any other make of switchboard, and have the jack ferrule constructed to fit any size plug. The spring jack being designed so as not to depend on the ferrule for a connection, makes a positive and reliable plug contact at all times.

THE BENEDICT & BURNHAM BRASS AND COPPER COMPANY, of Chicago, is now bringing to the notice of telephone companies in general the "H W W" wire connector, a novel, though simple form of connector for making joints in telephone wires at points where it is desired to open the circuit for testing or other purposes. The novel feature of this connector consists in each plate having two cylindrical grooves of different depths, accurately formed to fit two wires of different diameters, such as No. 12 and No. 14. When the grooves of similar depths are opposite. When one plate is turned around the single bolt, so that a deep groove in one plate is opposed to a shallow groove in the other, two wires of the same diameter, as two No. 14 or two No. 12, can be connected, and at all times the bolt will have firm bearing upon the wires and make a good contact. The connector, although having only one bolt, is substantially made with copper plates of sufficient thickness

to transmit the pressure without bending, and the bolt has a lock-nut arrangement to prevent loosening by vibration. This connector has been supplied in large quantities to a number of important telephone companies for several years and has been thoroughly tried with good results. In fact, the manufacturers have been busy supplying this large demand without extensive advertising. The device is patented but the prices are low.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE CHEAP!—Because of growing business, having now nearly 600 telephones in operation, we have been obliged to put in a new switchboard for our Central office to better accommodate our many patrons. Because of this change we now have for sale (which is the very thing for small country exchanges) six sections, 100 drops in each section, and will sell one or more sections. The switchboard was made by the Western Telephone and Construction Co., of Chicago, and is the common ground return. We also have five operator's stools to fit the boards. We invite correspondence or personal examination. Yours respt., LEACH & McARTHUR, Chillicothe, Mo. 166

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

WANTED.—To buy a Telephone Plant with 150 or more subscribers, located in Ohio, Indiana, Kansas, or Missouri. Address Box 164, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 164

WANTED.—Position by expert switchboard man and wire chief. Understands storage batteries, machines, gas engines, and outside maintenance. Best of references. Address Box 165, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 165

POSITION WANTED.—Have had extended experience in engineering, construction, equipment and management of Bell and Independent exchanges. Graduate Electrical Engineer. Address Box 163, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 163

\$AVE A DOLLAR OR SO. Toll Tickets. Your choice of twelve forms. Three colors, any ratio, prepaid, 5M, \$2.50. Cash with order. AMERICAN TELEPHONE JOURNAL knows we are O. K. Send for samples. GILDART BROTHERS, Albion, Mich. 131

POSITION—Competent telephone man desires position. Seven years' experience in both inside and outside work. Thoroughly understands Common Battery and Magneto Systems. Best of references. Address Box 154, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 154

POSITION—Energetic technically educated young telephone man desires managership of exchange of about 500 subscribers. Can operate economically and please subscribers. Will be at liberty May 1st. Can arrange to go to any good opening. Address, Box 160, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 160

POSITION—Wanted as wire chief or switchboard man. Nine years' experience. Good references. Address Box 158, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 158

WANTED—Permanent position by Telephone man with seven years' experience in construction and maintenance of local and long distance. References furnished. South or Southwest preferred. Address Box 161, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 161

YOU MAY SAVE A FEW CENTS


on one or more sizes by buying of some carload-in-a-place, woods-shipment man, but what about the chances for delay and mistakes in shipment?

Better get our Pole Prices, so you can order where you are sure.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Empire Building.

"From the Stump to the Line"



PITTSBURG & LAKE SUPERIOR IRON CO ESCANABA MICHIGAN

PRODUCERS AND WHOLESALEERS { We always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

CEDAR POLES

CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.

LONG

POLES

A

SPECIALTY.


JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago

Branch Offices: { Washburn, Wisconsin and Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



A SAMPLE
POLE
BY MAIL

is hardly possible, we admit.
But why not try a

SAMPLE CARLOAD
of our

POLES

BY RAIL

Our Prices are attractive and we can make prompt shipments.

SAND POINT CEDAR CO.
SAND POINT, IDAHO.

The Valentine-Clark Co.

Bag to announce to users of . . .

**CEDAR
POLES**

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .
**234 La Salle Street,
Chicago, Ill.**

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique
20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

YELLOW PINE CROSS ARMS

WE MAKE 'EM

AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	26		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	26 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.
CHATTANOOGA, TENN., U. S. A.

COOK PROTECTORS

STANDARD



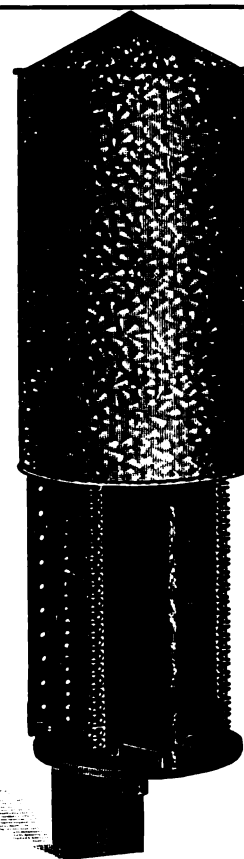
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS.—Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects.

Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

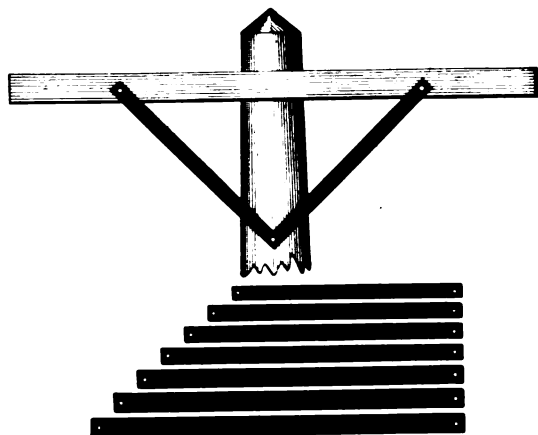
A B C of the Telephone.....\$1.00 By J. E. Homans.	The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
Diagrams of Electrical Connections......50	Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
Induction Coils.....\$1.00 By H. S. Norrie.	Practical Electrica. This volume could rightly be called an Electric Encyclopedia......75
Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	Systematic Treatise on Electrical Measurements..... By H. C. Parker.
Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	Electrical Catechism.....\$2.00 By George D. Shepardon.
Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	American Telephone Practice.....\$3.00 By Kempster B. Miller.
The Electric Telephone.....\$6.00 By G. B. Prescott.	How to Make and Use the Telephone.....\$1.00 By George H. Cary.
The Inspector and Troublemaker.....\$1.00 By A. E. Dobbs.	The Telephone......50 By Prof. A. E. Dolbear.
Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	The Telephone, the Microphone and the Phonograph..... By Count Dumoncel.
Practical Features of Telephone Work......75 By A. E. Dobbs.	Practical Information for Telephonists..... By T. D. Lockwood.
The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	Elementary Treatise on Electric Batteries.....\$2.50 By A. Niandet. Translated by L. M. Fishback.
Small Accumulators......50 By Percival Marshall.	Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	Conduits for Telephone Work..... By Arthur Vaughan Abbott.
Induction Coils.....\$1.00 By G. E. Bonney.	Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	Patents and How to Make Money Out of Them.....\$1.25 By W. R. Hutchinson.
Electric Instrument Making for Amateurs......50 By S. R. Bottone.	Wireless Telegraphy.....In Press. By C. H. Sewall.
Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
The Telephone.....\$1.00 By William J. Hopkins.	A Practical Guide to the Testing of Insulated Wires and Cables .....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal

116 Nassau Street,
CITY OF NEW YORK



CROSS ARM BRACES

PLAIN

JAPANNED

GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

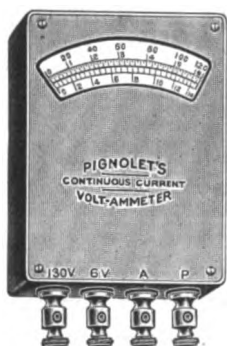
INDIANA

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

R O E B L I N G

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEBAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

Oak Insulator Pins and Brackets

Direct from North Carolina's immense Forest to you.

Orders filled at once; no delays, no "cussing." TRANSPPOSITION PINS, etc. a specialty.

ELKIN MACHINE CO.
ELKIN, N. C.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

PINS--BRACKETS

Let us send you a few reasons why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG, INDIANA.

E. CHURCHILL
HERON, MONT.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR
POLES
25 to 80 ft. long.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Make
a Specialty
of
Telephone
Poles.

P
O
L
E
S

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

FRANCIS
BEIDLER
& CO.
459-519 W. 22d St.
CHICAGO, ILL.

We Rush Orders...

COHN & BOCK

YELLOW PINE • CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Salesman

costs you lots of money. He covers a limited territory only.

An Ad

doesn't cost much, and covers the whole territory. Write for prices.

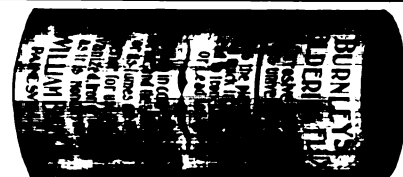
Blank Books and Forms

FOR TELEPHONE EXCHANGE and TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO




Do you always mention the

American Telephone Journal when writing to advertisers? It will be appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly.

LEWIS LUMBER & MFG. CO., HATTIESBURG, MISS.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR** :: ::
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

**W. H. CRUMB
& COMPANY**

Engineers
Contractors

**TELEPHONE
ENGINEERING
AND CONSTRUCTION**

*Plans, Specifications
and Estimates Promptly
Furnished. :: ::
Meritorious Independ-
ent Telephone Enter-
prises Financed. ::*

1263 MONADNOCK BLDG.,
CHICAGO, ILLINOIS

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

Keeling & Ridge Co.
General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL, \$250,000.00.
Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

MARLIN CABLE HANGERS

Have you seen our No. 3 Grade? Write for samples.
National Telephone Supply Co., CLEVELAND, OHIO.

Chicago Insulated Wire Co.

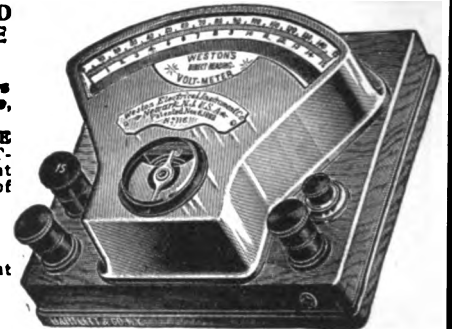
Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

**WESTON STANDARD
DIRECT READING**

Voltmeters, Ammeters, Millivoltmeters, Voltmeters
Milliammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.
LONDON—Killick Bros., Century Works, Lewisham.
PARIS—FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
Sole Manufacturers **THE OKONITE CO., Ltd. 253 Broadway, N.Y.**

WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL **Special Wire** FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____

State _____
American Telephone Journal
86 Nassau Street, New York City
Enclosed find \$1.50. Please send
me a copy of the Revised
"A. B. C. of the Telephone" and
a year's subscription to the
American Telephone Journal.

VITRIFIED CLAY CONDUIT

1, 2, 4 AND 6 DUCT

We make a specialty of

Superior Conduit

and Guarantee Satisfaction in Every Respect.

**Pittsburg Sewer Pipe
and Conduit Company**

PITTSBURG, KANSAS

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS**THE C. McINTIRE CO.**

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
WireFused Wire,
Fused Links
and
Strips.**STANDARD
Vitrified Conduit Co.**

B. S. BARNARD, Manager.

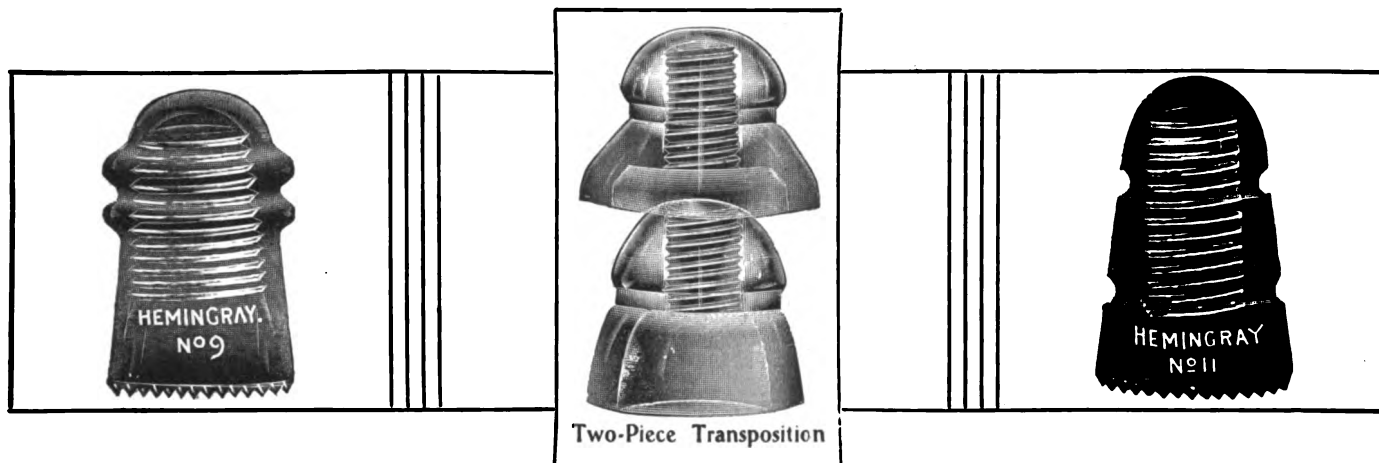
**39-41 Cortlandt Street,
NEW YORK.***Underground Clay Conduits.**High Grade Material.**Largest Factories in the World.**Stock Always
on Hand.**Single or
Multiple Duct.***We are Supplying the Largest
Contract in the Trade.****SEND FOR OUR CATALOGUE.****Dickey Conduits****VITRIFIED CLAY
SALT GLAZED****1-2-3-4-6-Duct.****Outside Steel Key Fastener (Patented)****Largest Manufacturers in the West.****Prompt Shipments.****W. S. Dickey Clay Mfg. Co.****NEW YORK LIFE BUILDING,
KANSAS CITY, MO.****BITUMINIZED FIBRE CONDUIT**A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and **Electrolysis Proof.**A duct that is and remains **Perfectly Aligned**, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles**Prompt Deliveries***Send for Illustrated Booklet**Ask for Prices, Giving Size and Quantities Required***AMERICAN CONDUIT COMPANY**336 Macy Street,
LOS ANGELES, CAL.**7th Floor, 170 Broadway New York**Manhattan Building,
CHICAGO, ILL.

THE STANDARD "HEMINGRAY"

ALL WITH THE "PATENT DRIP PETTICOATS."



THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

Factory, Muncie, Ind.

ESTABLISHED 1848.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

STATIONERY.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Columbia Electric Co., McCordsville, Ind.

Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Columbia Electric Co., McCordsville, Ind.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbing's Sons Co., John A., Trenton, N. J.
Seovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.



Experience
is a wise teacher

We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

4 MOST

4 EVER

Leich

4

Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

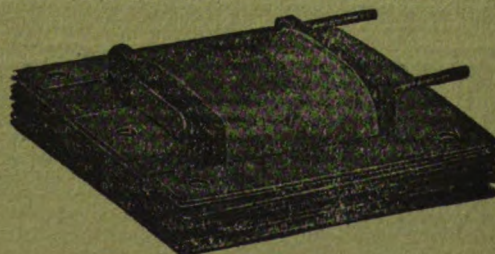
OR

MAGNETO

American Electric Telephone Company



SELECTIVE
IMPEDANCE
COIL



CHICAGO
ILL.



THE AMERICAN TELEPHONE JOURNAL

We could tell you—

every day for one hundred years that THE AMERICAN TELEPHONE JOURNAL is the best advertising medium for reaching the telephone trade.

But it wouldn't convince you like a good, strong letter of endorsement from a reliable, conservative advertiser.

So we quote the following letter:

We advertise only in the leading paper in each branch of the electrical industry, as we find it does not pay us to duplicate our advertising. We recognize THE AMERICAN TELEPHONE JOURNAL as the best for reaching the telephone trade. The money we invest for advertising in the JOURNAL brings us in paying results. Our advertising in your paper is very satisfactory to us.

STANDARD VITRIFIED CONDUIT Co.,
B. S. BARNARD, MGR.,
N. Y. City.

The JOURNAL has a larger circulation than all other telephone papers combined. This is why it pays its advertisers.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—APRIL 23, 1904—CHICAGO Number 17

PUBLISHED WEEKLY

Contents, Page 2

ONE DOLLAR A YEAR

Advertisers' Directory, Page 9

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

A TELEPHONE CATASTROPHE.....By Ewing Hutton
TRANSPPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION. Installment VI.....By Frank F. Fowle
AN EASILY ARRANGED TONE TEST CIRCUIT.....By C. S. Bundesman
WINONA CENTRAL TELEPHONE COMPANY TO EXTEND ITS SYSTEM
OPERATING RULES OF CITIZENS' TELEPHONE COMPANY, GRAND RAPIDS, MICHIGAN

The Operating Field:

DECISION IN SELF-RESTORING DROP PATENT SUIT
A TELEPHONE MAP BILL
KANSAS CITY HOME COMPANY PROSPERS
NEW SYSTEM FOR MANILA
INDEPENDENT TRUST RUMOR FALSE
QUERIES.

LOS ANGELES' FIRST YEAR IN INDEPENDENT FIELD
INDEPENDENTS WIN IN POST OFFICE CONTROVERSY
TO PREVENT WIRE HUMMING
SOUTHWESTERN KANSAS TELEPHONE ASSOCIATION ORGANIZED
EVANSVILLE MUNICIPAL FRANCHISE VOID
PATENTS.

THE EDITOR'S PAGE.

THE WEEK'S MESSAGES.

TRADE NOTES.

WANT AND FOR SALE ADVERTISEMENTS, PAGE 272.



SPRING IS HERE

WITH ITS

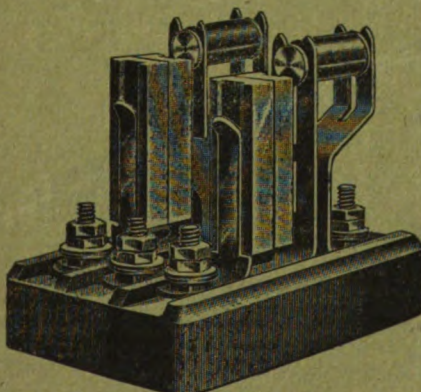
STORMS

ARE YOU PREPARED?

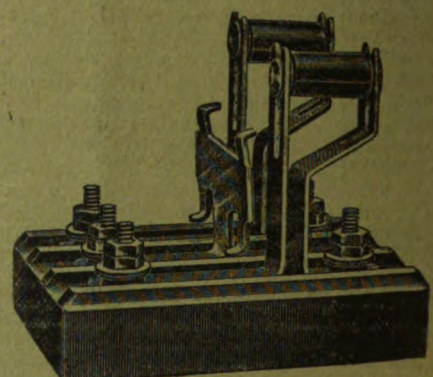
PROTECTORS

Of Every Type and Description
for Telephones, Cables and
Exchange Equipment.

WRITE FOR PRICES.



Something New in a Protector for Telephones.
Order No. 251 A.



Something New in a Protector for Telephones.
Order No. 251 B.

STERLING ELECTRIC CO.

LAFAYETTE, IND.



EXTRA POWERFUL

There is always something new 'under the sun.
Now it is our No. 36 X-P Type Telephone.

It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

We will tell you more about it if you ask.

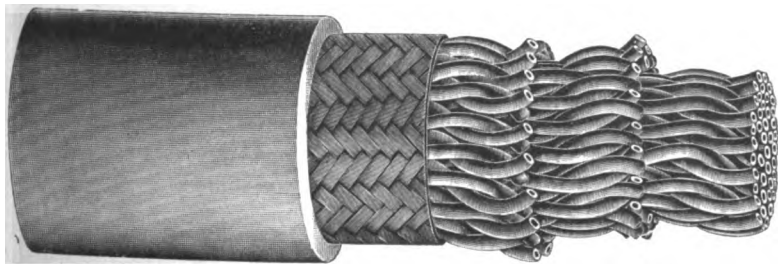
ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.

Manufacturers of



"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO., JONESBORO, IND.

SPECIAL

For a limited time we will sell Series Wall Telephones at the lowest price on record. Every telephone guaranteed for five years. For particulars, write us.

EASTERN TELEPHONE MFG. CO.,
WEST CHESTER, PA.



**HIGH-CLASS
TELEPHONE
APPARATUS**

FOR
ALL KINDS OF SYSTEMS

We can mail Bulletins
on the type of apparatus
you are interested in.

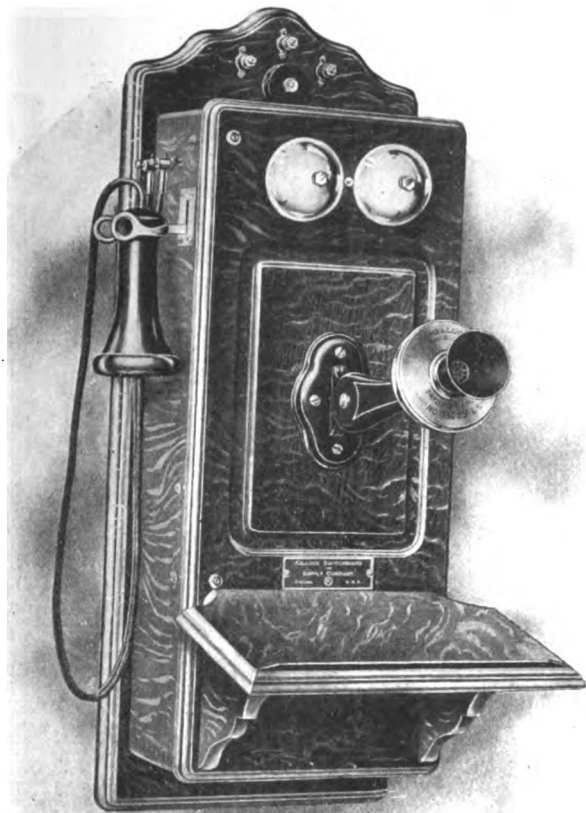
**STROMBERG-CARLSON
TEL. MFG. CO.**

Gen'l. & Eastern Office:
ROCHESTER, N. Y.

Sales Department:
CHICAGO, ILL.




Kellogg Magneto Telephones

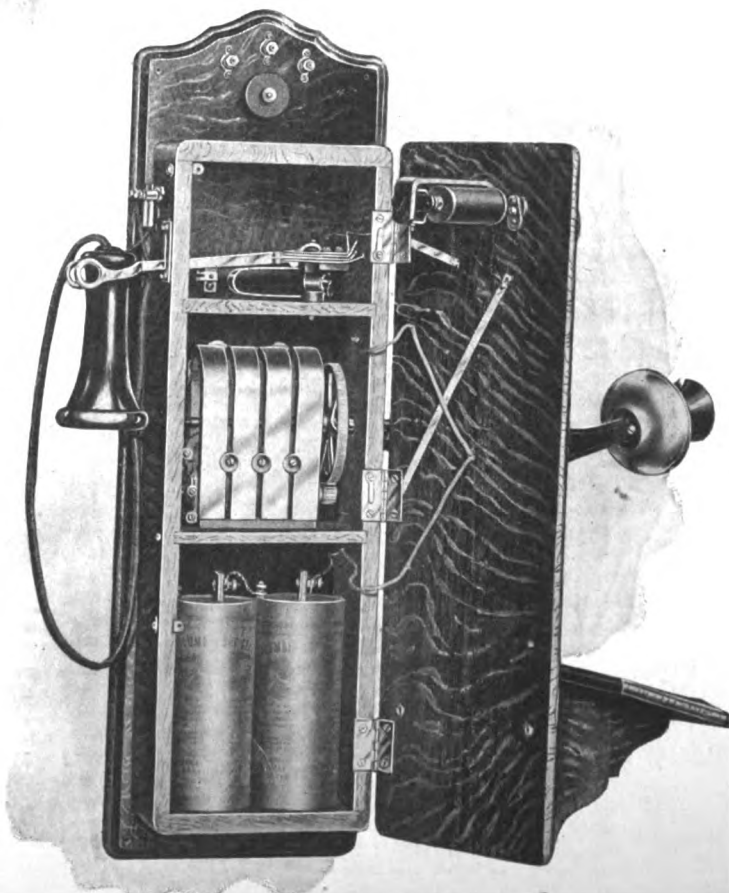


ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

*They are remarkably
durable, compact and
of handsome design.*

*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**
GREEN AND CONGRESS STS., CHICAGO



Electric Building . . . Cleveland
Keystone Telephone Building, Philadelphia

WE WIN!!

Self-Restoring Drop Patent Suit

DECIDED IN FAVOR OF THE

Western Telephone Mfg. Co.

This suit was begun about 8 years ago, and is the *most important case* affecting the patents on independent telephone apparatus. It involves nearly every company in the business.

The suit was against the *American Electric Telephone Co., P. C. Burns, et al.*, and was decided Tuesday, April 12, 1904, in the *United States Circuit Court of Appeals !!!* at Chicago.

The defendants are found to be infringers, and the Court granted an injunction prohibiting the manufacture of all Mechanical Self-Restoring Drops; except those made by the Western Telephone Manufacturing Co., or its predecessor, the Western Telephone Construction Co. An accounting for all Drops used also was ordered.—*This decision is final.*—Write to us for a Copy of the Decision.

WESTERN TELEPHONE MFG. CO.,

42 W. Jackson Blvd.,

CHICAGO, ILL.

THE "PIONEER INDEPENDENT TELEPHONE FACTORY."

TO OUR CUSTOMERS:

We want to assure you that the advertisement of the Western Telephone Manufacturing Company in this issue is almost entirely false.

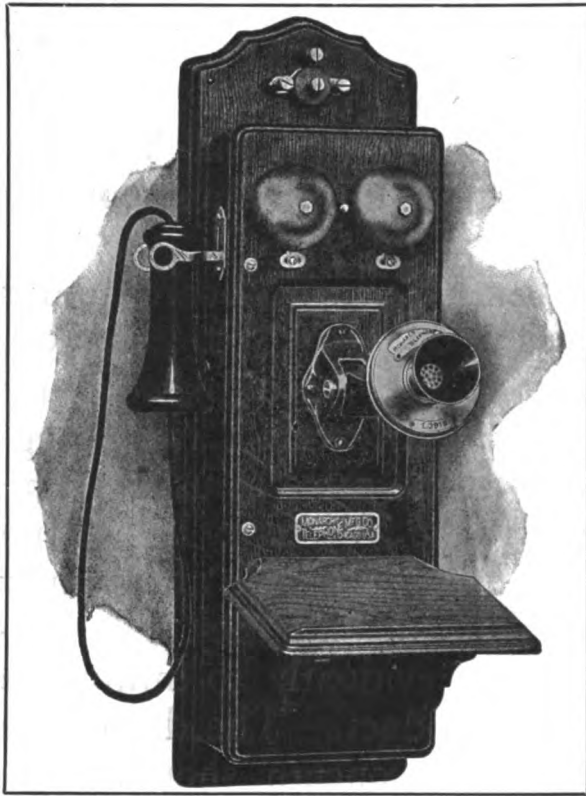
We manufacture the American Express switchboard under patent numbers 617,691, 617,692, 617,702, 618,610, 620,491, 624,075, 625,797, 669,094, 674,402, 692,895, 579,239, covering our famous self-contained drop and jack "unit feature", rapid ringing device and self-restoring ring off drops, the same as usual. The Court decision referred to does not entitle the Western Telephone Manufacturing Company exclusively to make and sell all manner of mechanical self-restoring drops as claimed, and they have unscrupulously lied and distorted the decree evidently to intimidate you and prospective purchasers of our product. The detestable prevarications of such an insipid and obscure concern, should carry no more weight than its predecessor, the Western Telephone Construction Company, of which James E. Keelyn was once president, and which was busted, bankrupt and sold out twice.

If you receive from them a scurrilous circular threatening you with an immediate injunction and instant annihilation, do not worry. We will protect our customers now as we always have in the past.

If it should be deemed advisable later to make some slight modification in the drop shutter (which is the only part affected by the decision) in order to avoid more clearly the obsolete arrangement of the Western Telephone Manufacturing Company, we will furnish the new shutters free of charge to our customers.

The fact that the majority of the switchboards made by the Western Telephone Construction Company are out of service or have been changed, is sufficient evidence that their board is not acceptable to competent telephone engineers.

AMERICAN ELECTRIC TELEPHONE CO.,
CHICAGO.



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

Monarch Telephone
Mfg. Co. 14 SO. CLINTON STREET
CHICAGO, ILL.

To String a Clumsy Desk Set---

the whole thing, mind you, receiver, transmitter, upright and base—up to the ceiling so it will operate down and up in a limited way by means of a pulley, coarse cord and a piece of iron as a counter-weight, is certainly a crude way of relieving one's desk of the encumbrance; but two cases of the kind have recently come under our direct notice, and there are many others.

That necessity is the mother of invention is thus again proven, and so is the utility and convenience of a device like

THE PENDENT TELEPHONE

which was evolved from the necessity of the patentee to have his desk and papers and second telephone free from obstruction at all times, and both phones usable by others without interfering with him.

His first apparatus was also somewhat crude, but it has been absolutely perfected and now stands—or, rather, hangs—in a class by itself.

It is movable down, up or laterally almost without limit; calls Central automatically; is efficient, durable, ornamental and inexpensive; and is worthy 30 days' trial by any man.

THE VOUGHT-BERGER COMPANY
MAKERS OF FIRST-AWARD
Telephones, Switchboards and Appliances
LACROSSE, WISCONSIN

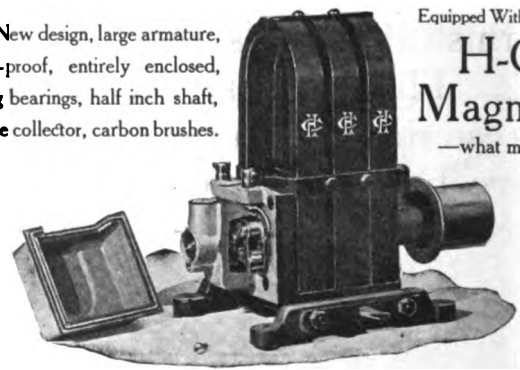
Hold There!

¶ One thing at a time. Just jot down in your memory that this is the most powerful

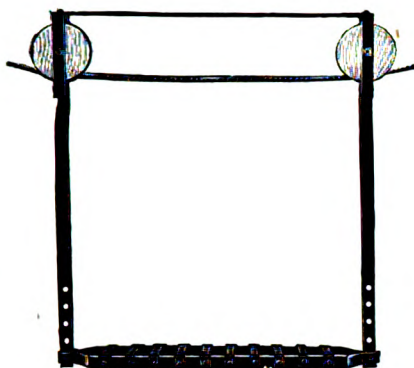
Magneto Power Generator manufactured.

¶ New design, large armature, dirt-proof, entirely enclosed, long bearings, half inch shaft, wide collector, carbon brushes.

Equipped With Heavy
H-C Magnets
—what more.



The Holtzer-Cabot Electric Company
BROOKLINE, MASS. : : : : CHICAGO, ILL.

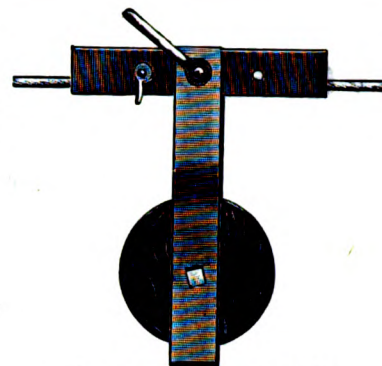
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



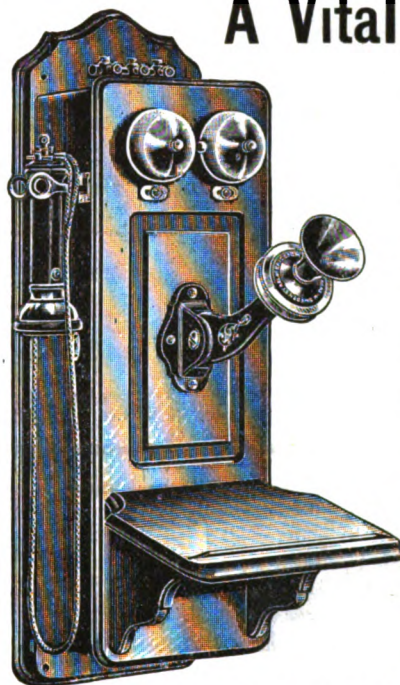
Patented December 15, 1903
"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.....	36	Kellogg Switchboard & Supply	5
American Electric Teleph. Co....	40	Co.....	5
Am. School of Correspondence....	—	Klein, Mathias, & Sons.....	34
American Vitrified Conduit Co....	39	Leslie, A. C., & Co.....	12
Automatic Electric Co.....	37	Lewis Lumber & Mfg. Co.....	33
Barr, W. J., Mfg. Co.....	37	Lindsley Bros. Co.....	32
Beidler, Francis & Co.....	33	McIntire, C., Co.....	36
Benedict & Burnham Brass & Cop-	11	Maltby Lumber Co.....	29
per Co.....	11	Medora Milling Co.....	33
Bissell Co., The F.....	11	Michigan Cedar Co.....	33
Burnley Battery Co.....	33	Middleton, J. W., & Co.....	34
Butterfield, J. F.....	34	Miller Anchor Co.....	—
Camp, The H. B. Co.....	39	Monarch Telephone Mfg. Co.....	8
Central Mfg. Co.....	—	Mullen, Frank.....	33
Central Telephone & Electric Co....	10	Nagel, W. G., Electric Co.....	9
Century Telephone Const. Co.....	11	National Battery Co.....	9
Chicago, Burlington & Quincy Ry.	34	National Telephone Supply Co....	—
Co.....	34	National Wire Corporation.....	35
Chicago Insulated Wire Co.....	—	New Haven Novelty Machine Co..	31
Chicago Writing Machine Co.....	—	Nungesser Electric Battery Co....	35
Churchill, E.....	33	Okonite Company.....	34
Cohn & Bock.....	33	Pacific Coast Pole Co.....	30
Columbia Mfg. Co.....	33	Pignolet, L. M.....	32
Connecticut Teleph. & Electric Co..	10	Pittsburg Lake Superior Iron Co..	29
Cook, Frank B.....	—	Prosser & Son, L.....	33
Couch, S. H., Co.....	10	Roebing's, John A., Sons Co.....	32
Crumb, W. H., Co.....	34	Sand Point Cedar Co.....	30
Dickey Clay Mfg. Co., W. S.....	36	Scovill Mfg. Co.....	31
Eastern Telephone Mfg. Co.....	3	Spargo, James A., Wire Co.....	34
Electric Appliance Co.....	3	Standard Underground Cable Co..	12
Elkin Machine Co.....	33	Standard Vitrified Conduit Co....	36
Ericsson Telephone Co.....	9	Stanton, L. W.....	34
Fahnestock Transmitter Co.....	—	Sterling, W. C., & Son.....	33
Fostoria Electric Supply Co.....	12	Sterling Electric Co.....	2
Fowler, John H.....	29	Stromberg-Carlson Telephone Mfg.	—
Garton-Daniels Co.....	11	Co.....	4
Gest, G. M.....	38	Swedish-American Tel. Co.....	12
Hemingray Glass Co.....	—	Telephone Printing Co.....	33
Holtzer-Cabot Electric Co.....	8	Valentine Clark Co.....	30
Imperial Finance & Cons. Co.....	34	Vought-Berger Co.....	8
Indiana Rubber & Insulated Wire	3	Wanted, Situations, etc.....	272
Co.....	3	Western Telephone Mfg. Co.....	6
Ingram-Richardson Mfg. Co.....	37	Weston Electrical Instrument Co..	34
Index of the Technical Press.....	30	Wisconsin Timber & Land Co.....	33
Inland Steel Co.....	32	Worcester, C. H., Co.....	29
International Telephone Mfg. Co..	11	Yesbera Mfg. Co.....	—
Keeling & Ridge Co.....	34		

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

A Vital Business Necessity



Is a good telephone service; to have such service a perfectly equipped instrument must be used.

Our No. 251 wall set is equipped with the **best**, the **genuine** Swedish Ericsson receiver and transmitter, the latter being furnished in metal or hard rubber as desired.

This type telephone is made with folding or stationary shelf, the latter making a more compact looking instrument.

SEND FOR CATALOG

ERICSSON TELEPHONE COMPANY
"INDEPENDENT"

Mfrs. of Switchboards, Telephones and Telephone Supplies
296 BROADWAY, NEW YORK, N. Y.

STORAGE BATTERIES

UP-TO-DATE **TELEPHONE BATTERIES** MUST HAVE

HIGH CAPACITY

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

CONSTANT CURRENT FLOW

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

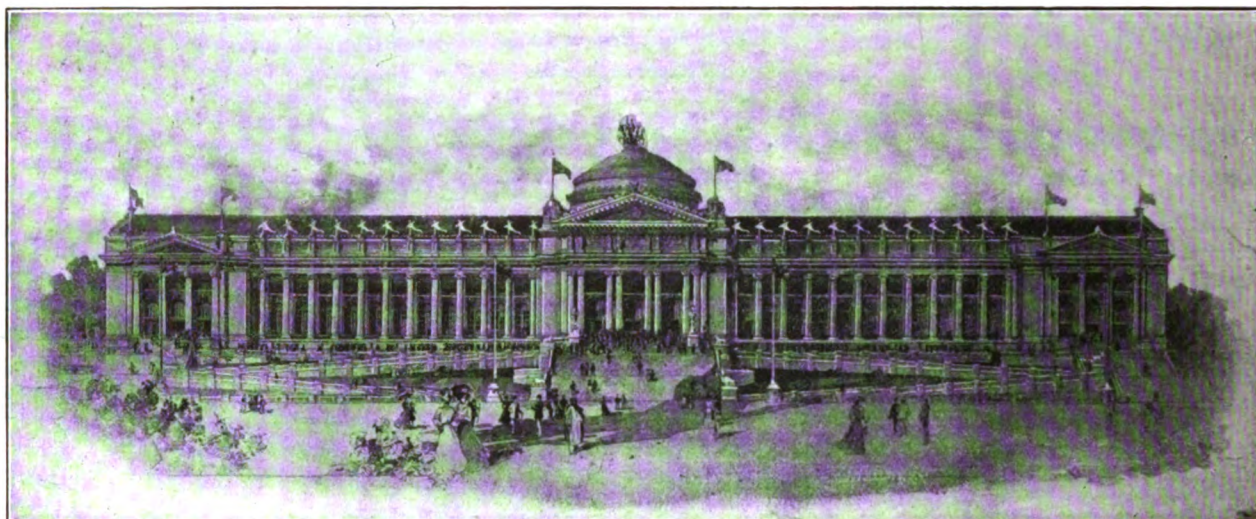
GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

World's Fair Art Catalogue No. 18

NOW READY
Mailed Free on Request

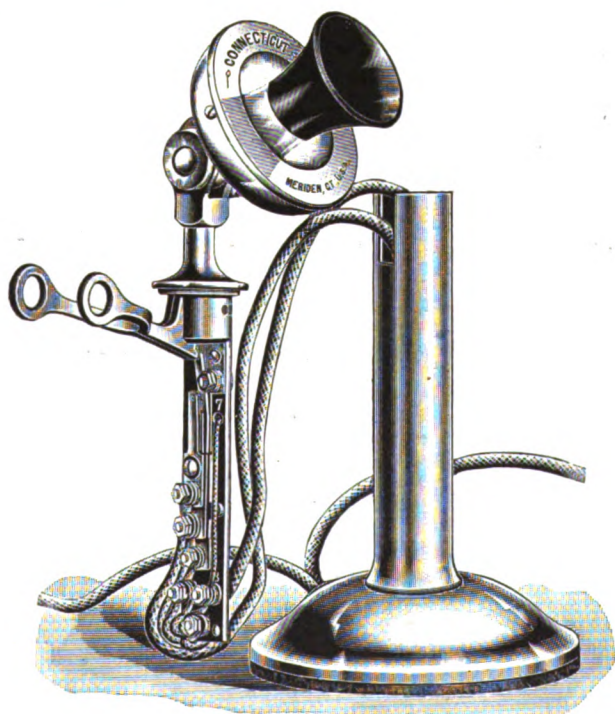
TELEPHONE
INSTRUMENTS



UNITED STATES GOVERNMENT BUILDING.

TELEPHONE
SUPPLIES

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus 909 Market Street, St. Louis, U.S.A.
Dealers in "Everything Used with Telephones"



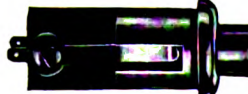
TYPE "A"
AN UP-TO-DATE EQUIPMENT
ALWAYS FOUND IN "CONN." APPARATUS
WRITE FOR PRICES
CONNECTICUT TELO. & ELEC. CO.
MERIDEN, CONN., U. S. A.

The reason COUCH TELEPHONE APPARATUS

works better than other makes is easily
seen when you look at the parts that
enter into their construction.



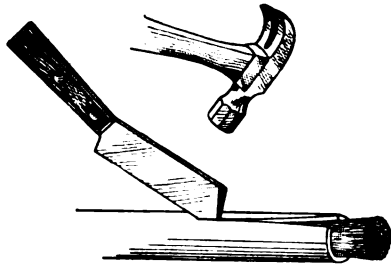
"Justrite" Hook Switch
Sample prepaid 60 Cents.

Send for one.  Sample prepaid
25 Cents.

"Workrite" Push.

S. H. COUCH CO.
162 Pearl Street, Boston, Mass.

Cable Sheath Knife



For Splitting Cable Sheath. Write for Price.

THE F. BISSELL COMPANY
TOLEDO, O.

No Magnets

You can't burn it out if you try

The G. D. DROP

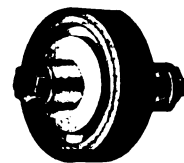
Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple. Durable. Cheap. *Pamphlet Do.*



GARTON - DANIELS CO., Keokuk, Iowa

THE CENTURY "Platinum Electrode" Transmitter

Electrode Surface Pure Platinum



FRONT VIEW

Double Auxiliary Mica Diaphragms

Electrodes Insulated From Transmitter Body



BACK VIEW

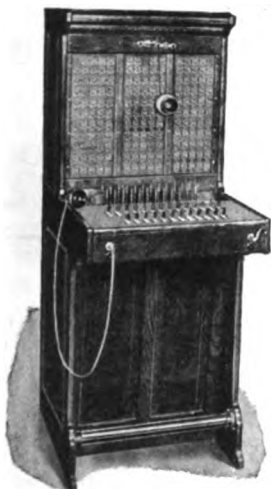
Unequalled for Quality of Transmission

2 VIEWS OF TRANSMITTER CUP

ALL CENTURY TELEPHONES
Equipped with this Transmitter.

Century Telephone Construction Co.
536 Ellicott Sq., **BUFFALO, N. Y.**

IT'S OUR BUSINESS to convince you that in our new type EXPRESS BOARD



We have reached the acme of

Electrical and Mechanical Perfection

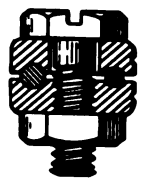
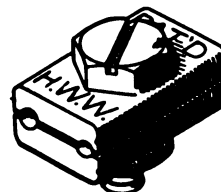
Made in any desired capacity up to 1000 lines

Descriptive matter, sample parts and quotations on request

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS

"H. W. W." WIRE-CONNECTORS

are used for making Test-joints in Telephone Wires on Toll or Exchange Lines. Each plate has two grooves of different depths. By reversal of one plate around the bolt, two wires of the same or of different diameters can be connected.



Simple and effective. Inexpensive and economical. Extensively used by large Telephone Companies. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.

**DEVELOPMENT AND PROGRESS
STAND FORTH CLEARLY IN**

SWEDISH AMERICAN



APPARATUS

WRITE FOR CATALOGUE

SWEDISH AMERICAN TELEPHONE CO.
CHICAGO.

**A REVOLUTION IN
TELEPHONE PROTECTORS**

The Marvel of the Twentieth Century—Just Out

AGENTS WANTED

FOSTORIA ELECTRIC SUPPLY CO., Fostoria, Ohio

MAGNET STEEL

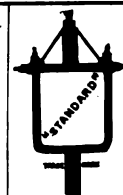
Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 103 Randolph St., Chicago, Ill.

**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insula-
ted Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON.

NEW YORK.

PHILADELPHIA.

CHICAGO.

SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, APRIL 23, 1904

NUMBER 17

A UNIQUE TELEPHONIC CATASTROPHE

By EWING HUTTON.

THE New York Telephone Company was recently the victim of an accident remarkable in the annals of telephony, and which indicates in a forcible manner the sensitiveness of

telephone installations, the extraordinary recuperative power possessed by an organization so thoroughly equipped as that of the telephone company in question, and the absolute dependence which the social world now places upon telephonic communication. That portion of the underground railway system of New York City which is now under construction between the Post Office and the Battery along Broadway, is being prosecuted by what is known as the "covered excavation process"—that is to say, each night a section of street paving is removed and a slight excavation made beneath it. The street surface is then restored by means of heavy planks supported upon proper timbers, and under the artificial roof thus constructed the workmen are enabled to continue excavation without interfering in the slightest with the traffic in the street above. Of course, such a process as this exposes all the

subterranean street structures, among which the conduits carrying the cables of the telephone, telegraph and electric light companies are by no means insignificant. At present Broadway is completely undermined from the Post Office to Trinity Church, and, pending

the replacement of the completed subway structure, all of the electrical conduits have been suspended in one way or another from the roof and sides of the excavation, as shown in Fig. 2.

About half-past eight o'clock on the morning of April 6th a thin curl of smoke was noticed issuing between the planks which cover the street at the corner of Broadway and Fulton. The fire department was summoned, the street planking ripped up, and the subway deluged with water. Fig. 3 shows a photograph taken from the other side of Broadway. While but a few minutes sufficed to extinguish the flames, the resulting damage put the entire Cortlandt Street exchange *hors de combat* for many hours. Subsequent investigation showed that a large telephone manhole had existed at the corner of Fulton street and Broadway, containing a large number of telephone and telegraph cables.

The excavation for the subway required the removal of this manhole, and temporarily the cables were supported upon staging and planking, as is shown in Fig. 2. In order to prevent injury to the lead sheathing

of the cables each had been wrapped with burlap. The fire was caused by some telephone repair men who, while drying out the moisture from some of the wires by pouring heated paraffin over them, accidentally set fire to the paraffin. It can be readily under-

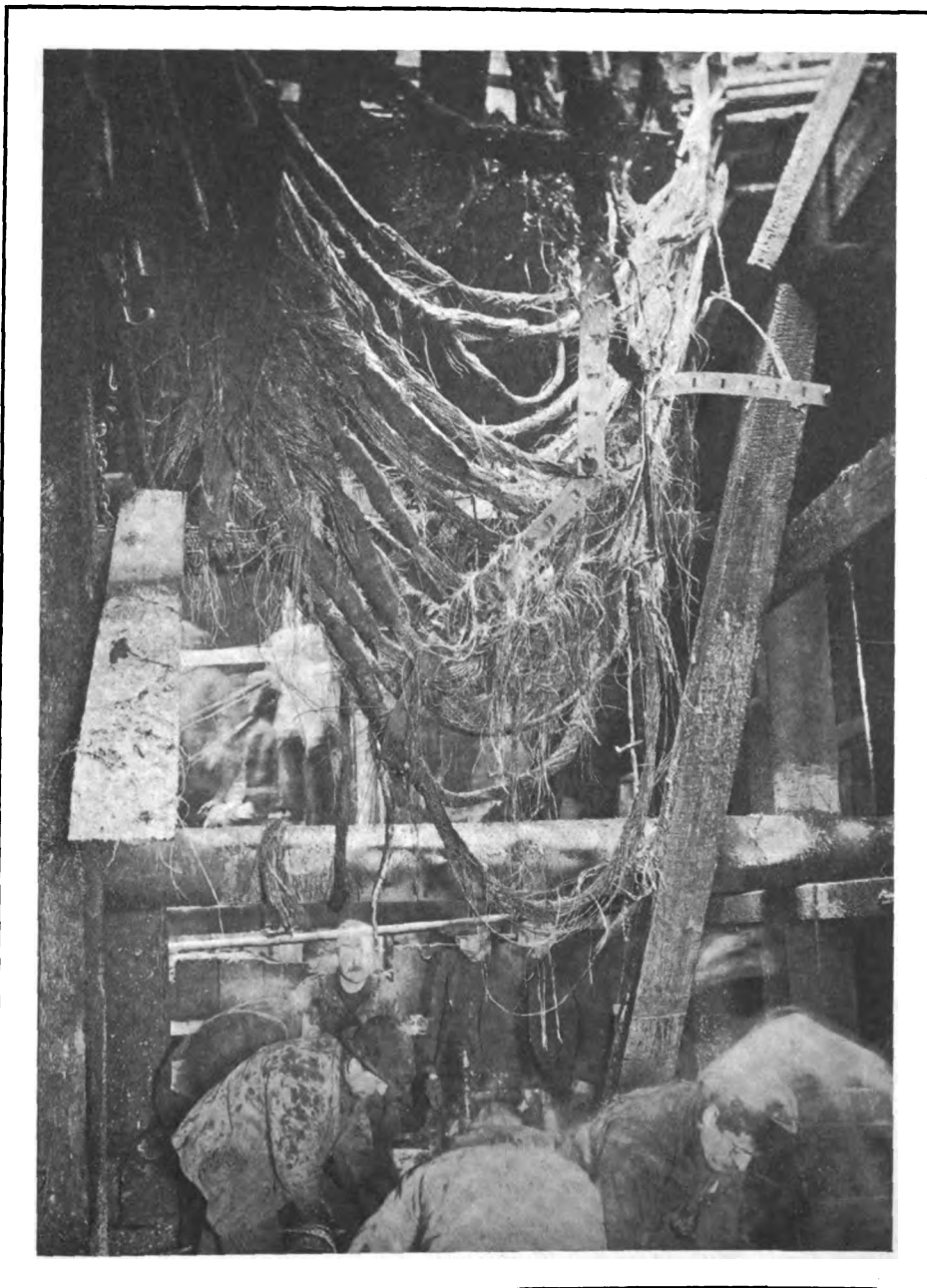


Fig. 1. Condition of Cables After Conflagration, Showing Chaos of Bare Conductors.

stood that a very slight flame was sufficient to ignite the burlap, with which the cables were covered, and as the lead sheaths are easily melted at a temperature of from 350 to 400 degrees, a very slight fire was all that was necessary to strip the cables of their sheaths and expose all the conductors to the flames. In addition, the telegraph cables contributed a quantity of rubber insulation, which added a lot of very inflammable material capable of producing large volumes of thick, black smoke. As a result, within a few moments all of the cables in the ill-fated manhole had become fused together in an inextricable mass. As the quantity of inflammable material was small the fire department were enabled to extinguish the flames within a few seconds, but before the engines had arrived upon the spot all of the damage had been done.

It appears that about 22 cables were put out of service, among which were one 600-pair cable and a number of 300-pairs, aggregating about 5,250 pairs of wires, among which were about 1,950 local trunks and about 50 long-distance trunks, including a special cable loaded with Pupin's coils, extending from Cortlandt street eastward into Connecticut. The first notification of this accident was the simultaneous flashing of nearly all the subscribers' lamps upon the Cortlandt street switchboard, for as soon as the cables became uninsulated the lines were short-circuited and each signal lamp testified to this occurrence. Naturally, such a state of affairs created the liveliest excitement among the operators. It was in vain to at-

tempt to answer calls, and presently all the plugs on the switchboards were exhausted in an endeavor to put out the signal lamps. The balance of the lamps necessarily remained illuminated and this

caused such a heavy drain upon the battery as to blow out the fuses and thus protected both the switchboard and the power plant from a flow of current which otherwise might have been disastrous in the extreme. Until order was restored, business at the Cortlandt street exchange was practically suspended, and it is estimated that something upwards of from 10,000 to 15,000 messages were lost.

As soon as the nature and extent of the difficulty was appreciated the most vigorous measures were resorted to to effect repairs as promptly as practical. Long distance service was restored inside of an hour and a half by switching over cables terminating in the neighboring exchanges. Calls reaching Cortlandt street, or other offices, were transmitted by the trunk lines through John street, Broad street and Spring street, and in this way, the business of the downtown district, for the remainder of the day, was handled in a surprisingly satisfactory manner, considering the magnitude and extent of the injury to the wire circuits. The next step was that of repairing the gap caused by the destruction of the cables. As large a force as it was practical to employ was placed at the scene of the injury. The injured portion

of each cable was cut away for a sufficient distance on either side of the break to insure the extraction of all damaged conductors. Then a new piece of cable was spliced in to fill the gap. This

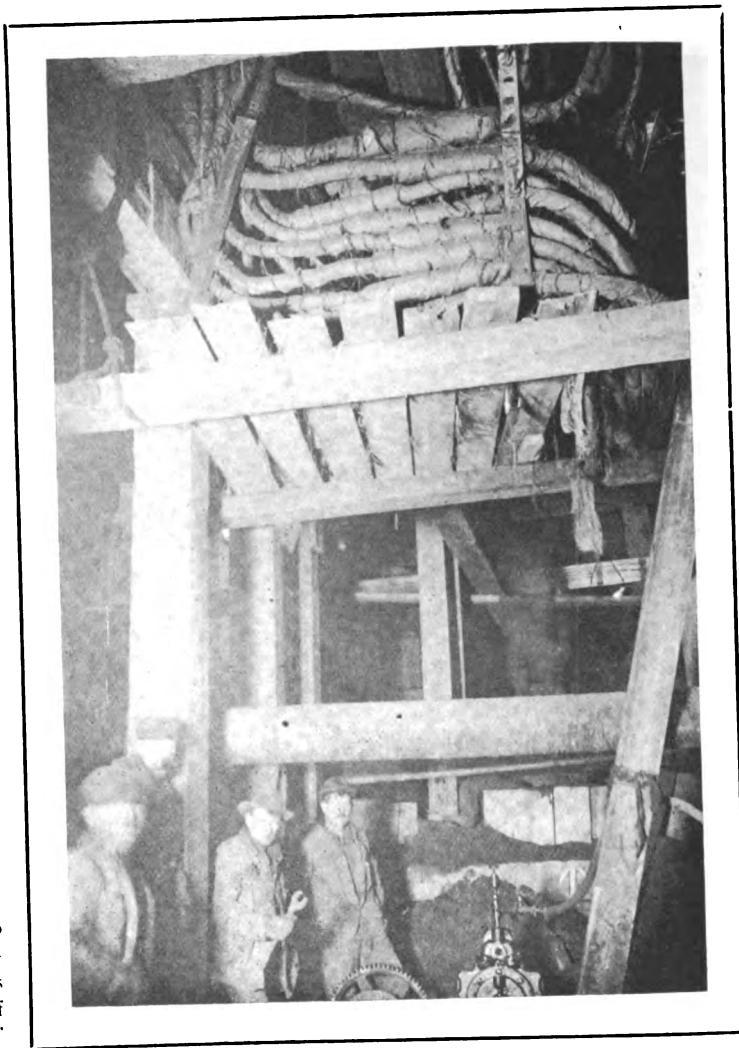
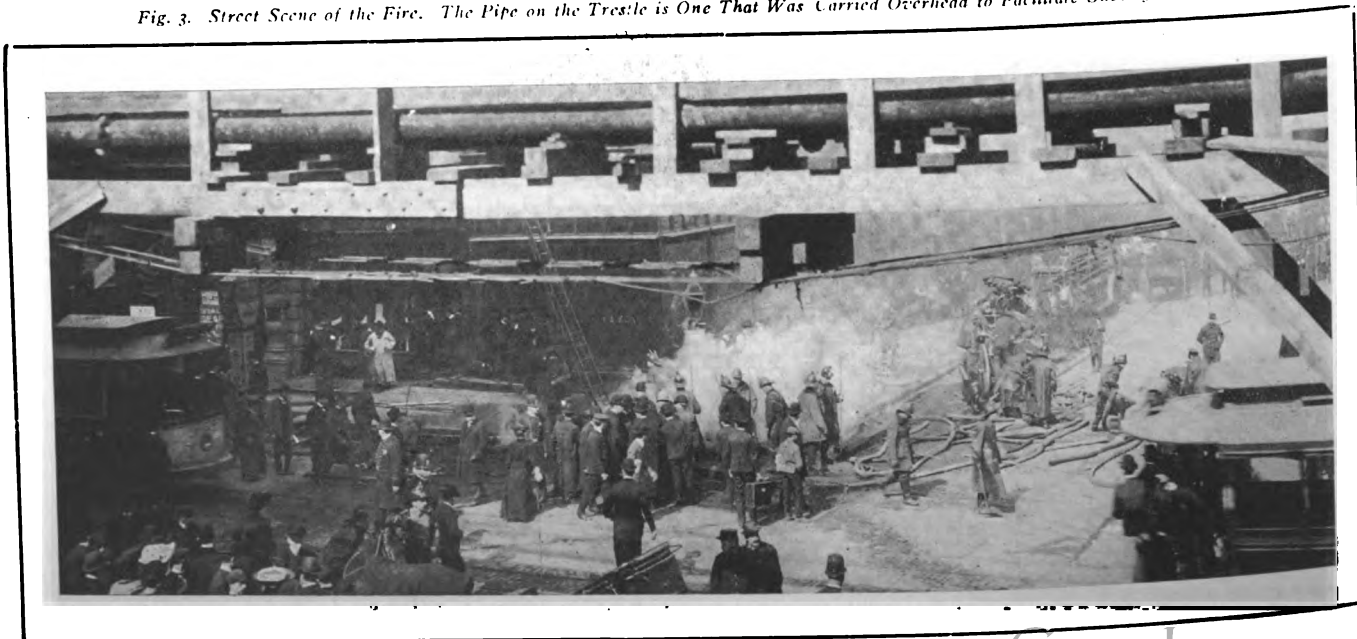


Fig. 2. Showing Cables of Fig. 1 Prior to the Fire. The Burlap Wrapping That Caused the Trouble is Conspicuous.

Fig. 3. Street Scene of the Fire. The Pipe on the Trestle is One That Was Carried Overhead to Facilitate Subway Operations.



process rendered it essential to test every pair of conductors in each direction to insure that the spliced in piece should properly bridge the gap, which amounted to something over 20,000 wires. And as it is reported that not a single error was subsequently discovered, some idea may be gained of the remarkable skill which is attained by expert telephone wire men.

Fig. 1, taken from the Scientific American, gives an illustration of the appearance of the manholes subsequent to the fire, from which some idea may be gained of the difficulty of prosecuting such an intricate piece of repair work in so small and confined a location. To expedite matters, many of the cables were opened at other manholes, where the testing was done. The splice made at the injured location being straight work, by this means it was possible to complete the repairs in about half the time that would have been required, provided all the testing had been attempted at the Fulton street location. By means of efficient organization the telephone company was enabled to complete the work so that all circuits were in good order by six o'clock on the evening of the day after the fire. During this time about 70 men were continuously employed and an average of 18 splices were being simultaneously made.

The actual cost of the repair work to the telephone cables is estimated in the neighborhood of \$3,000, though this by no means measures the loss sustained in traffic, the inconvenience to subscribers who were unfortunately, though necessarily, subjected to the possible injury to business which the deprivation of telephonic service necessitated. In addition to the New York Telephone Company, the Postal Telegraph Company, the Gold Stock Company, the Holmes Burglar Alarm, the District Telegraph Company and the New York fire alarm system were equally incapacitated over this portion of the street.

While the speed with which the service was reinstated is one of the strongest testimonies to the efficiency of traffic organization, this incident is a forcible lesson of the desirability, nay, the necessity, of providing duplicate routes over which communication may be carried on, particularly in the case of so important installations as the telephone, telegraph and fire alarm system of the lower part of New York City. Fortunately, during the time that the fire alarm wires were out of service no fire of magnitude occurred south of Barclay street, but one can readily imagine what might have occurred had the fire which destroyed the office of the Adams Express Company, a few days earlier, taken place at this time.

The experience in the recent fire in Baltimore, through which the underground electrical circuits passed absolutely unscathed, is the strongest evidence of the insurance with which a properly protected conduit line is surrounded. But it is easy to imagine that an occurrence similar to that of this subway fire may readily take place in any manhole, for a gasoline torch may easily be overturned, the lead sheath of a cable can be injured with the flame of a match. As it is constantly necessary to make changes and rearrangement of increased circuits, every manhole becomes the possible field of a similar injury. This only goes to show that in the designing of wire plants for such inconvenient locations, they should embrace duplicate sets of traffic lines so arranged as to extend through different thoroughfares. This would undoubtedly add some to the cost of plant installation, but, considering the magnitude of the fire risks involved, of the importance of business which is now transacted by the telephone and telegraph, such expense seems to be fully justified from every standpoint. In connection with the accident it may be of interest to traffic men that only three complaints were received due to this trouble.

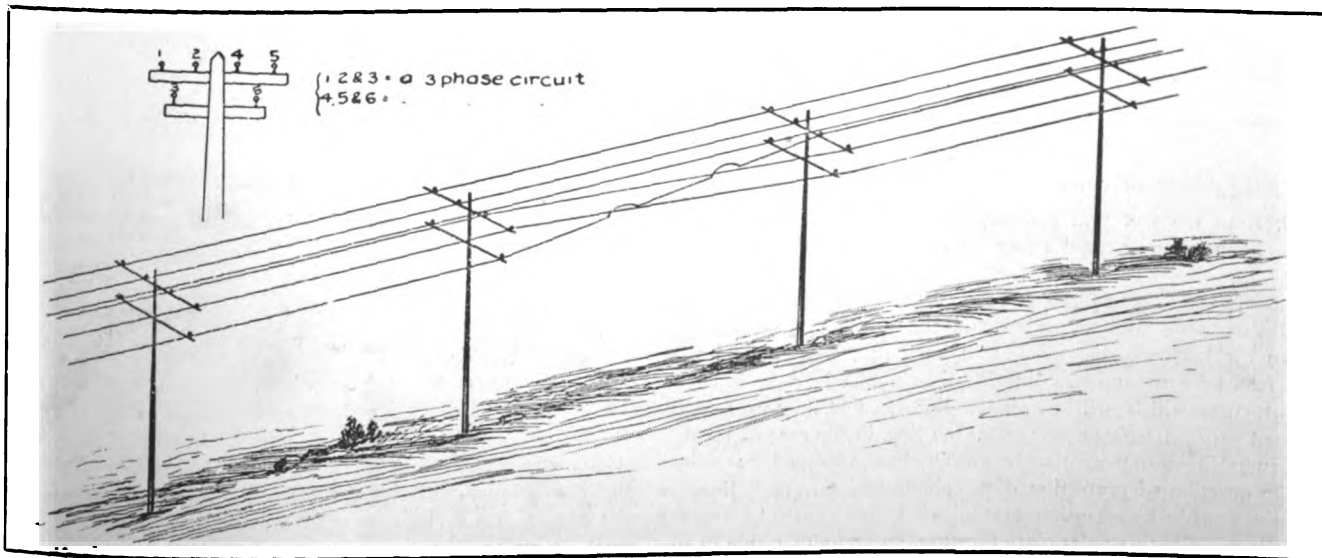
TRANSPOSITION OF TELEPHONE LINES: CROSS TALK AND INDUCTION*

BY FRANK F. FOWLE.

VIII.—JOINT OCCUPANCY OF LINES WITH REFERENCE TO HIGH ENERGY SYSTEMS, HIGH TENSION TRANSMISSION AND THE QUESTION OF PROTECTION.

It is not uncommon practice, in the residential districts of towns, to occupy a pole line jointly with electric light, power and telegraph wires. The question of leakage is an extremely serious one and can be eliminated only by the best construction and efficient maintenance. *Poor construction will*

point other than the standard insulators. The power and electric light wires should be well insulated, securely tied in and strung reasonably tight. Considerable slack in the power wires or electric light wires renders the transpositions less effective and also invites trouble on the power or electric light systems.



Transposition of a three-phase line.—a right-hand spiral of one-third revolution. See Fig. 6. Common high-tension practice.

completely vitiate the expected results from a perfect system of transpositions. Telephone wires should be securely tied in and insulated everywhere. The line should be thoroughly trimmed and wires should not be touching objects of any character at any

The practice of stringing the power wires or the electric light wires with the two wires of a pair as far apart as the cross-

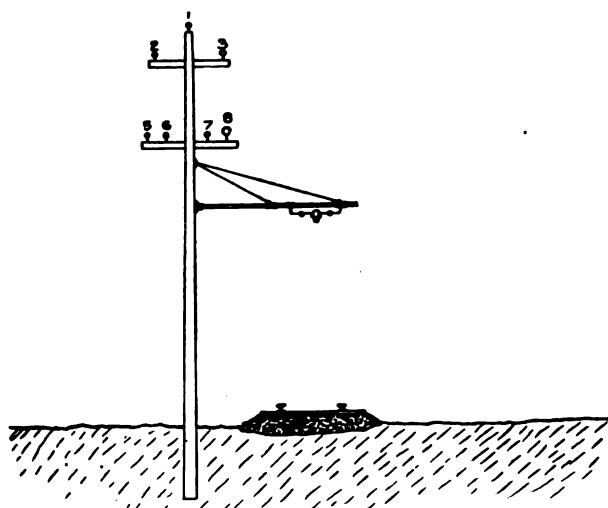
* Paper read at the Annual Convention of the Association of Railway Superintendents, at New Orleans.

arm permits, gives rise to the greatest induction in the telephone circuits. It is extremely advisable to have the power wires strung as close together as possible and as far from the telephone wires as possible. Power and telephone circuits should never be on the same cross-arm.

There is a difference of opinion as to whether the telephone wires should be above or below the power or light wires. This is a matter which can be determined, in general, only by local conditions. The line which is least likely to break or to get in trouble and on which the fewest changes will probably be made should be above the other line. As a rule, telephone development probably takes place faster than power and light development and there are usually more telephone circuits than circuits of other character; and in this case it is advisable to have the power and light circuits above the telephone circuits. In the reverse case, it is vital that plenty of clearance should be left for the telephone linemen to reach their own wires without any hazard from the high-tension circuits.

When the voltage of the high-energy circuits reaches the vicinity of 5,000, it is probably inadvisable to occupy a line jointly with such circuits. The constant current alternating system of arc-lights is not included in this. The voltage on these circuits sometimes reaches a total of 9,000 or 10,000, but this voltage exists only between the two sides of the circuit at the power house and the voltages met at intermediate points are never as high as this.

As to when a transmission line may be termed a high-tension line, probably the simplest definition of this is when bare wires are



High-tension, 3-phase transmission on wires 1, 2 and 3. Block signal circuit on wire 7. D. C. feeder on wire 8. Telephone circuit wires 5 and 6.

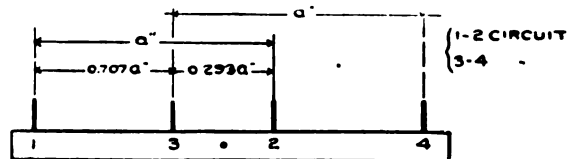
Single-track, long haul, electric railway service. Apply method of Fig. 11, in transposing 5 and 6; treat spirals, feed taps to trolley wire, signal boxes, turn-outs, junctions and telephone stations as discontinuities in the exposure of 5 and 6 to 1, 2, 3, 7, 8 and the trolley wire; transpose midway between two consecutive discontinuities throughout the distance of exposure.

used, from the fact that ordinary line wire insulation is of no use. Such a line should never be occupied jointly with other lines; meaning by other lines, low energy telephone and telegraph systems. When the voltage is 10,000 or above, the pole lines should be well separated and the minimum distance between the butts of poles should be such that when the highest line falls toward the other line, it will completely clear it. Any construction which will permit a high-tension line to become crossed with a telephone or a telegraph line, in the case of trouble or general break-down, is to be absolutely condemned.

The question of protection of telephone and telegraph lines at crossings with high-tension transmission lines may be treated as follows: Set two poles close together, one on either side of the lowest line; make these two poles so high that the greatest length of broken wire which can swing downward from the upper line will clear the lower line. String a guard screen of iron wire over the lower line as an additional protection.

High-tension lines are usually transmitting large amounts of energy and there is a power-house capacity behind them, capable,

usually, of supplying several thousand kilowatts. The extremely high tension in conjunction with the large amount of energy available renders electrical protection which may be provided on the telephone circuits or telegraph circuits, usually wholly inadequate, and the danger of crossings with such lines is so great as to jeopardize human life and property. Too much care can scarcely be taken in protecting the low energy lines from the possibility of crosses with such high-energy high-tension transmissions. There is no protective device in the market which will protect low-energy systems cheaply and effectively. Such apparatus may be possible, but it is probably cheaper to eliminate the condition by spending no inconsiderable amount in making the line secure from the possibility of trouble from high-tension systems.



An arrangement of two metallic circuits, for no mutual induction; from formula (12).

Applicable to a 4-wire, 2-circuit telephone line, or to a 2-phase, 4-wire power line.

APPENDIX.

Capacity and inductance of a grounded circuit of No. 12 N. B. S. G., from formulæ (3) and (1). Wire (copper) weighs 173 lbs. per mile. Diameter, 0.104 inch.

h.	Microfarads	Henries
Feet.	per Mile.	per Mile.
10	0.01060	0.002796
20	0.009796	0.003019
30	0.009379	0.003149
40	0.009105	0.003242

Two grounded circuits of No. 12 N. B. S. G., at the same height and a foot apart. See formulæ (18), (19), (20) and (21).

h.	Self-Capacity, in	Mutual Capacity, in	Self-Inductance, in	Mutual Inductance, in
Feet.	Microfarads.	Microfarads.	Henries.	Henries.
20	0.01171	0.004732	0.003019	0.001187
30	0.01150	0.004936	0.003149	0.001318

Increase of self-capacity, due to the adjacent grounded circuit, is respectively 19.6 and 22.6 per cent.

Metallic circuits of No. 12 N. B. S. G. Capacity and inductance for various separations, from formulæ (4) and (2).

Separation, in Inches.	Capacity, in Microfarads, per Mile.	Inductance, in Henries, per Mile.
10	0.008503	0.003546
12	0.008218	0.003663
14	0.007992	0.003762
16	0.007806	0.003848
18	0.007649	0.003924

WINONA CENTRAL TELEPHONE COMPANY TO EXTEND ITS SYSTEM.

THE Winona Central Telephone Company of Winona, Ohio, began the extension of its system to the village of Dunganon, where an exchange will be installed with 40 or 50 telephones. The main line will be extended from Dunganon to Lisbon, which will give the Winona company two trunk lines to the county seat. The system at Winona has about two hundred instruments in operation, extending over a wide territory. It has connections with most of the Independent systems in Northern Columbiana County, and with the Columbiana County Telephone system. Within a short time an additional trunk line will be strung between Winona and Salem, which is badly needed. The work of extending the lines will be in charge of Dillwyn Stratton and Edgar Fowler.

AN EASILY ARRANGED TONE TEST CIRCUIT

By C. S. BUNDESMAN.

HAVING had some experience in common battery exchanges the writer has found it is very convenient to use the tone test herewith described. Others have constructed such an arrangement from a buzzer and a few cells of battery, but their use is limited to circuits of low resistances.

The material necessary to construct this apparatus will cost very little and consists of a few cells of closed circuit battery,

repeating coil with a quite high resistance winding, this noise may be reproduced in any number of circuits.

The following are a few of the uses of the tone test: To ascertain if a pair of conductors are good, insert clip *A* (Fig. 2) into the springs of the exchange cable head, then send a lineman to the loop where the cable appears, where he can go across the pair with his head telephone, and if the tone is heard in the

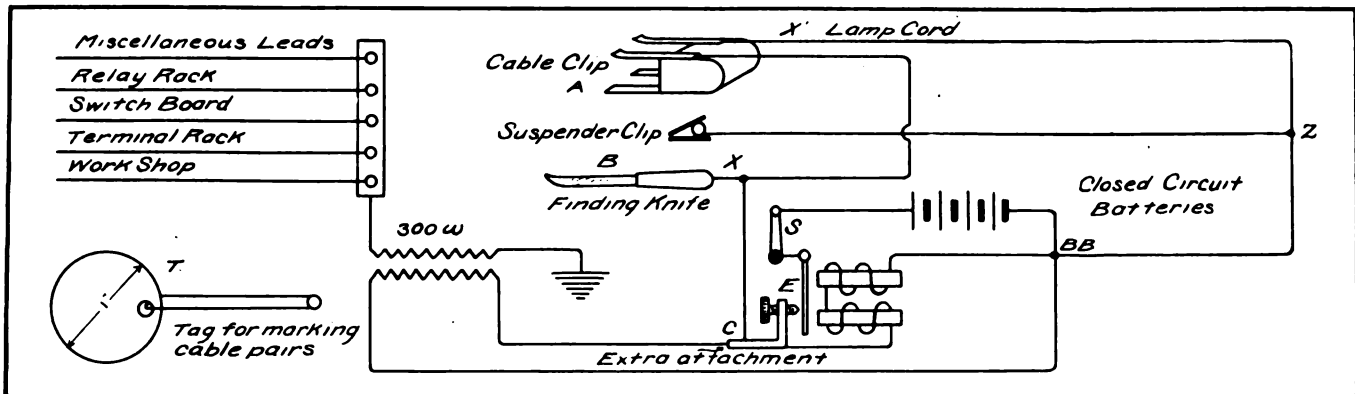


Figure 2. Circuits of an Easily Arranged Tone Test.

a one point switch, a good buzzer, one repeating coil, a strip of brass suitable to make the buss bar, about a dozen suspended clips, one testing clip and about one hundred feet of flexible cord. By following the diagram (Fig. 2) no trouble should be experienced in the wiring. The buzzer should be placed so that it can be heard in any part of the terminal room. In running the leads *X* and *X'*, care should be used to see that the lamp

head telephone it indicates that the conductor is O. K. He then short-circuits the pair with his screw driver, and by so doing stops the buzzer from vibrating. By referring to Fig. 2 it will be noticed that a short circuit so placed will cause the battery to flow around the buzzer instead of through the winding, or, to be exact, it short-circuits the battery. The stopping of the buzzer attracts the attention of the terminal man, who can then go in on the pair and talk to the lineman.

To test a new cable, after the necessary connections in the office have been made, the terminals opened to prevent grounding, and the pot head at the terminal pole made, a lineman with two head telephones and a number of tags as *T*, (Fig. 2), should be sent out. He can find a pair that the tone is being sent out on as described. After finding the pair he connects one of his head telephones to this pair, (Fig. 1). This pair is to talk over. He then can be instructed to ground one side of the other telephone as at *GP*, (Fig. 1). The suspender clip of lead *X*, (Fig. 2), may be grounded in the office. The knife can then be held on one side of the pair as *FP*, (Fig. 1). The lineman then can find the wire by touching the free side of his telephone to the ends of the wires until he finds the one the tone is being sent out on. The tone is then sent out on the other side of the pair and if received the lineman can designate accordingly. If the pair is No. 1 at the office, then it is No. 1 at the loop. In marking, the use of a small round tag about one inch in diameter, such as is shown at *T*, in Fig. 2, is advisable, as it has no edges and comers to catch and interfere. The cable is now ready to connect to the box, the corresponding numbers on the tags to be connected to the corresponding numbers in the cable box.

To test for grounds after a lightning storm, take the suspender clip of lead *X*, (Fig. 1), and ground it, then with the knife run over the springs of the terminal as at *LS*. The moment the knife touches a grounded line the buzzer will cease vibrating. By taking out and cleaning the carbons the trouble may possibly be cleared. In testing out circuits others than the ones mentioned, use the leads from the repeating coil. The average troubleman is familiar with testing his own circuits and should have no difficulty in using the tone test for other purposes. This test can be used to a good advantage for a busy test, indicating lines in trouble, or can be used for a howler test.

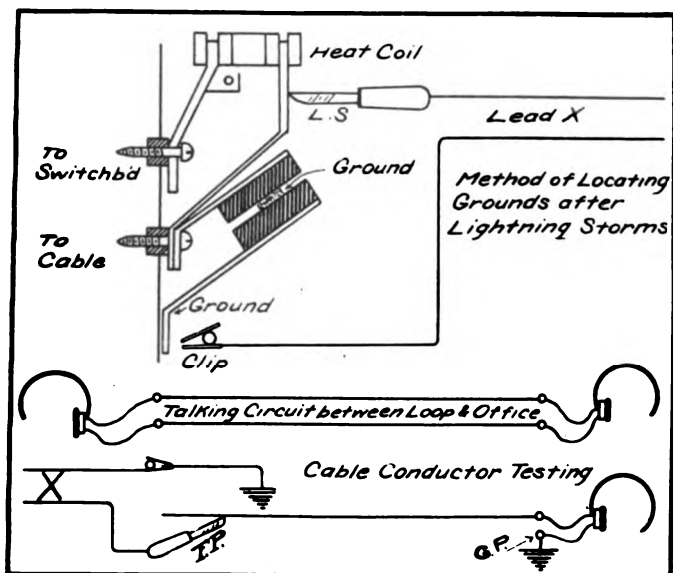


Figure 1. Methods of Using Tone Test.

cords, fastened at *Z* (Fig. 2), are long enough to reach any terminal.

The operation of the buzzer is the same as usual, by placing an extra binding post at *C* and at *BB*, if a head telephone be connected to these connections, each time the circuit at *E* is broken a loud noise, caused by the interruption of the battery will be reproduced in the head telephone. The intensity of this noise is dependent on the number of cells of battery and the frequency of vibration of the armature of the buzzer. By the insertion of a

OPERATING RULES OF CITIZENS' TELEPHONE COMPANY, GRAND RAPIDS, MICHIGAN

TO secure the best possible results in handling long distance connections, a set of rules, the text of which follows, has been formulated and issued by general manager C. E. Tarte, of the Citizens' Telephone Co., Grand Rapids, Michigan:

1. Operators must be courteous in all their dealings with subscribers and with each other, but must hold no conversation beyond that necessary for receiving calls and making connections. For any difficulty in service, the subscribers must be connected with the Chief Operator.

2. Operators must speak in clear tones, directly into the transmitter. The receiver must be retained at the ear continuously while the operator is at the switchboard.

3. Operators are forbidden to use the lines for personal or other communications that are not in the nature of company business.

4. Be business-like and courteous in your dealings with other operators as well as with the public. Be concise and clear and remember that every second spent in useless words means just that much delay on a call. Avoid holding the line for one moment longer than is absolutely necessary to accurately transact business.

5. Line operators upon receiving a call from a distant point must answer by giving the name of their office.

6. Upon receipt of a call from a customer the operator must at once answer: "Long Distance," and obtain the information as to desired destination of call, the telephone number of firm desired, the name of the individual wanted at the telephone, and the name of the party calling. In transmission of calls to other towns the following order must be observed: "Grand Rapids, 1221, wants Bement & Sons, Lansing." (If a certain person is wanted, give his name also.) Upon receiving calls from an outside point, operator should answer by giving the name of the station instead of answering "Hello;" and the station calling should immediately give their name, etc. Thus: If 1221 in Grand Rapids wants Bement & Sons, Lansing, when the Lansing operator gets the call from Grand Rapids, she should plug in and say "Lansing." Grand Rapids operator would then say, "Grand Rapids, 1221, wants Bement & Sons, Lansing."

7. In the event of a call being delayed, the operator handling the call must notify the subscriber of the reason for such delay, and on the receipt of the report on a call, reports must be transmitted to the subscriber calling. Never keep a subscriber in ignorance regarding his call. If a subscriber is not kept informed, he will naturally conclude that no special effort is being made to put the call through. When subscriber called for is out, or fails to answer his telephone, follow up the call without waiting for the distant station to call again. Do not try to shift your responsibility to some one else, but get calls through without regard to where they originated.

8. Operators must note on the back of the ticket every effort to get subscribers or line called for, with reason for delay, using the following code of abbreviations:

"A B" "Anyone who can talk business."
"A G" "Try No. ——— again."
"A M" "Before noon."
"A P T" "Appointment call."
"A Y" "Anyone answering the telephone."
"B Y" "Busy."
"C A" "Cancel."
"C H" "Change to ———."
"C O" "The chief operator for same."
"D A" "Does not answer."
"D S" "Discontinued."
"G D" "Not there, not expected to-day, or out of town."

"L F" "Left telephone."
"L K" "Try to get your party."
"L V" "Leave word to call."
"M G" "Messenger charge."
"M R" "Report to Monitor."
"N C" "No circuit."
"N F" "No telephone."
"N H" "Not there."
"N L" "Not listed."
"N R" "Nothing definite to report."
"O D" "Out of order."
"O F" "One of the firm."
"O F C" "Office."
"O K" "All right."
"O R" "Report to No. ———."
"P M" "Afternoon."
"P R" "Operator answer on ———."
"R E P" "The representative of the person called."
"R N" "Unable to get party's name."
"R V" "Reverse call."
"U" "Out, will be back in ——— minutes."
"U D" "Out, don't know when will be back."
"U N" "Unknown."
"W D" "What department."
"W H" "We have No. ———."
"W N" "What telephone No?"
"W O" "Give name of person calling on ———."
"W T" "Party will talk at ———."
"W X" "Which one is wanted?"

By the use of these abbreviations, with the notation of the time preceding the abbreviation, a complete record will be obtained, which will be of value not only to the company but to the operator in case of any report of trouble. If all tickets indicate, in this abbreviated form, the various efforts made to get the parties called for, it will be evident in looking up trouble that the operator in question has done her duty. So far as is possible this code will be used in transmitting calls and reports.

9. Operators must watch connections carefully for any interruption to the service by cutting in on the line at intervals.

10. Make every effort to get your message through successfully, and co-operate in every way to complete incoming calls as well.

11. Charge on messages will start when the person, or telephone called for, is connected with the subscriber calling. Allowance may be made for a reasonable time in which to get the individual called to the telephone. Some subscribers are in the habit of sending an office boy to the telephone and having him insist on hearing the individual called before he will call to the telephone the individual who has put in the call. This frequently results in considerable loss of time. Subscribers who have a habit of doing this should be notified that they will be charged from the time that the individual asked for is connected with the other line. Then they are at liberty to do so. (Matters of this kind should be referred to the chief operator or manager.)

12. Always listen in on a circuit and wait five seconds before speaking. Always use battery cut-outs when listening in. Every precaution should be taken not to interrupt conversations.

13. Operators at intermediate offices, on a through connection, must listen carefully before plugging in, and allow ten seconds to elapse before using the circuit. If after listening for ten seconds she finds the circuit in use she shall, *without speaking, immediately cut out.*

14. Operators must watch the circuits under their charge and

assure themselves that conversations are carried on without difficulty. It is the duty of the operator to report to the chief operator any failure of circuits to give good commercial service. Where conversations are interrupted the operator will make due allowance therefor, noting on the back of the ticket the nature and duration of same.

15. When trouble appears on a circuit in use, the connection must at once be transferred to the best circuit available.

16. Report any trouble or seemingly unwarranted delay in making up connections, either through faulty circuits or operators at other points, to the chief toll operator, giving complete data as to time, circuits used and routes. Attach this report to the ticket.

17. When call is made for a particular person, the customer is not to be connected with the line until the person wanted is at the distant telephone. If call is made for a telephone number, or firm or company name, the operator will ask, "Any particular person?" If the person called for is out, say he is out and find out if any one else will do. Should the customer then desire to talk with the office, make the regular charge for the service.

18. When a line has been held for over-time you will always call back the subscriber and inform him of the amount. This is to be done in every case, except where the subscriber requests that it be not done.

19. If application is made to reverse the charge for service, the operator at the originating end, before completing the connection must ascertain from the distant end if such charge is acceptable, and if so, the originating and receiving operators must both mark the ticket "reversed" and the receiving operator must indorse on her ticket the name of the person that OK'd the message. Reversed messages must be supervised by the receiving operator.

20. You will not reverse charges on any messages without first obtaining the consent of the party who is to pay for it. When you reverse charges get O K from proper person at telephone where message is to be charged.

21. A ticket shall be made for each and every message passing through the office.

22. Make out your tickets carefully and above all accurately. Omit nothing and put down the time finished as well as the time connected, whether there is overtime or not. Take nothing for granted.

23. All messages must be checked. (The only exception to this rule is such messages as are sent over the line for the purpose of making tests, locating trouble, etc.)

24. Operators are particularly warned against the habit of gossiping over the line, and must understand that such gossip will not be tolerated.

25. The names of subscribers using the telephone, and any information regarding calls must be considered as strictly confidential. Operators must not repeat to other operators, to any employee of the company, or to outsiders, conversations passing over the line. Gossip regarding subscribers who use the service is prohibited at all times. The attention of operators is called to the fact that the law makes it an offence punishable by fine or imprisonment to violate the secrecy of telephonic communications.

26. In case of a subscriber's inability to talk with ease to a distant subscriber, the operator at the originating end may, and should, repeat the message, and if she is unable to get the message through properly, the terminating operator, or an intermediate operator may be called in to repeat. In such cases a reasonable allowance should be made in timing messages, but

the matter should be referred to manager or chief operator for consideration.

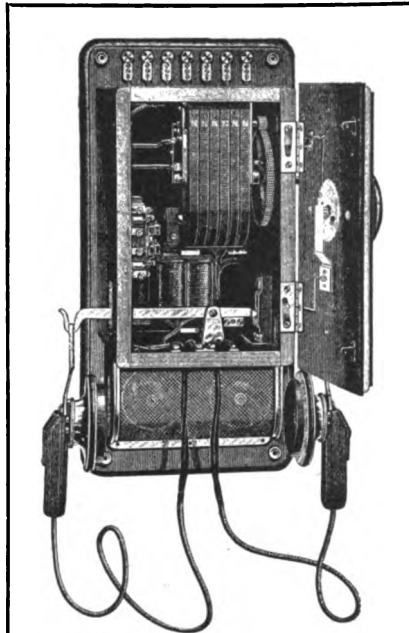
27. Operators should bear in mind that nearly all points are reached by two or more routes and should not give up attempts to get a call through until they have tried every route. All operators should familiarize themselves with the various routes and stations of the company, and should be able to route the majority of calls without having to refer to routing directions. On through and incoming business, operators must not question the right of a distant point to route a connection through or to such stations. It will be their duty to put up the connection asked for, and then report facts to the chief operator or manager.

28. The messenger charge for sending for individuals will be 10c. If the charge for sending is more than 10c., the calling station must be notified and the full amount collected. On calls on which messenger service is required, a messenger should be sent immediately, the messenger should ascertain when he will do so. Reports made by messenger must be transmitted immediately to the station calling. Operators must not ask subscribers to send out for neighbors. When calls are received for non-subscribers, messenger must be sent and the non-subscriber instructed to go to the central office or to the nearest public station.

29. Long distance operators should know all of the signals used at automatic pay stations and should be able to distinguish instantly the denomination of any coin dropped into the machine. When new operators are employed, they should be fully instructed in the use of these machines.

30. Instructions for daily tests, which should be followed, will be issued from the general manager's office.

31. In every exchange where a chief operator is employed in connection with long distance service, said chief operator will decide the time allowance to be made on tickets in case of trouble or interruption; will handle, as far as is possible, messenger appointments and delayed calls, and will have general supervision and charge of long distance work, subject to the instruction of the manager. Operators will refer to chief operator all complaints and requests for special or unusual information and will promptly notify said chief operator of any shortage of circuits, and of any conditions which affect the efficiency of the service. The company desires at all times to be fair in its treatment of employees, and expects in return that all employees will use their best efforts in its interests, and will be courteous in their dealings both with each other and with the public.



A GERMAN RAILWAY AND TRAMWAY DESIGN.

This is a bridging instrument and has the usual high wound bell coils. Twelve or fifteen stations are intended to be worked on the same line. The heavy wire grating protects the bells from the attacks of the malicious and yet allows the signal to be heard. This is necessary because the apparatus is intended to be installed in unprotected places along the railway right of way. According to the somewhat accepted foreign practice two receivers are used, one for each ear.

UNITED STATES' NEW EXTENSIONS.

THE United States Telephone Company has available for extension purposes the sum of \$150,000, and the work of extending its long distance lines is to be rushed with all haste the coming summer. The company is at work on a connection between Dayton, O., and Richmond, Ind., a distance of thirty-four miles, which will be completed within a short time. When it is done, Cleveland will be given a through connection to Kansas City and through St. Louis, and the company will be in a position to make a particularly strong bid for the World's Fair business. It is the plan to have the line in operation in ample time for the exposition rush. Beginning next month the company will take up the work of pushing its eastern connections through to Buffalo and from there to Philadelphia. A branch line is also to be built, connecting Cleveland with Wheeling, W. Va. The extra wire to Toledo has already been strung from Cleveland, and the connection with Chicago will also be made during the coming summer.



THE BELL BORROWS

\$20,000,000.

THAT interesting and historical corporation known as the American Telephone and Telegraph Company has succeeded in securing the money necessary for overhauling its somewhat antiquated telephone systems, principally in the middle West. Last week the company borrowed on five per cent. notes due in three years, the very respectable sum of \$20,000,000. As many of the Bell systems need overhauling badly, this sum, large as it is, will be more than exhausted before they can be put on an actual competitive basis.

This seems much like locking the stable door after the horse has been stolen, yet, the money being needed, perhaps the officials of this once great and arrogant monopoly ought to be congratulated on the success of their endeavors to increase the sum total of the company's indebtedness. However, when one stops to consider the real significance of the transaction, the Bell stockholders would seem to be deserving of sympathy.

The American Bell Telephone Company has raised and handled enormous sums in the past. Great sums are necessary to build and maintain telephone systems. The significant part of the transaction is that for the first time in its corporate existence the Bell concern has been obliged to go to bankers for money and to pay a comparatively high rate of interest.

The original intention was to issue the stock of the parent concern to the required amount. It was once an easy proposition to place Bell telephone stock. Investors fell over one another to secure it and to get in on the ground floor. Bell stockholders have been signally blind to the fact that a cloud considerably larger than a man's hand had appeared on the Bell horizon. But somehow they did not want the stock of the proposed new issue. It was then decided to issue bonds, and accordingly a bond issue of \$20,000,000 four per cents. was authorized. Again, there was a hitch in the proceedings. The company was already heavily bonded, and in the face of the money market the officials did not dare attempt to float the new bond issue. The Western Union accounting, whereby the Bell concern will be compelled by the courts to disgorge many unearned millions rightfully belonging to the Western Union Telegraph Company, was too vivid in the minds of Bell stockholders and bondholders. The foreclosure of the Michigan Bell Telephone Company and the waste of money in the purchase of The Kellogg Company was still fresh in the memory.

But the money had to be raised, and the only recourse was to go to the banks for a straight loan, and for the first time the company's notes at five per cent., running three years, were put on sale.

This enormous sum is to be spent in extensions and reconstruction. That most of it must go for reconstruction cannot be doubted by those who have been watching the course of events. As was notorious in the case of the Michigan Bell, the property of many of the licenses has been allowed to gradually deteriorate.

THREE YEAR NOTES AT 5 PER CENT.

This was noticeable at first to the general public for the reason that there was nothing with which to compare the service. Patrons fumed and fretted, but, as a rule, charged the shortcomings up to scientific necessity.

Then Independent companies began to get a foothold, and gradually the public became educated up to what proper telephone service really was. Then the depreciation became more and more apparent. Some of the Bell companies were financially able to make necessary improvements and to this in a measure hold their own against the competition, but others, like the Central Union and the Michigan, were too far gone. Hence the \$20,000,000 loan.

As far as THE AMERICAN TELEPHONE JOURNAL can determine, much of the blame for this bad state of affairs is chargeable to the Independent telephone companies. If they had kept out of the field, the public would have gone on groaning, yet to the limited extent of the service, patronizing the Bell concerns, only dimly conscious of the extent of their wrongs. If these Independents had only been able to realize that the telephone is a natural monopoly and that the great American public is the legitimate prey of such a monopoly, this thing might never have happened.

It is said that during the late war the Spanish soldiers complained bitterly because the Yankees did not fight according to rule. Instead of falling back when fired upon, as properly educated troops should have done, they charged right ahead, regardless of everything, and the Spaniard had nothing to do but to get out of the way. This same unfair warfare has characterized Independent telephony. The Independent operators have charged right ahead, regardless of natural monopoly and the natural rights of such a monopoly to plunder the people. The result has been trouble for Bell stockholders. The water has been squeezed out of their holdings and bankruptcy stares them in the face. Still the Independents charge on and the real pitiful part of it is that even now some of the Bell stockholders do not seem to know what has struck them.

So the American Bell Telephone and Telegraph Company has given its notes for \$20,000,000 at five per cent., due in three years. Twenty million dollars are a great deal of money, and three years constitute a very short period of time. What will happen when the three years expire? That is a decidedly interesting problem. No one supposes for a minute that the loan can be repaid in that time. Possibly three years from now the money market will be such that a new bond issue can be floated and the day of settlement can be thus delayed. But it is more reasonable to suppose that the adverse conditions prevailing now will be intensified then. For an expenditure of \$20,000,000 is not going to check the mighty wave of Independent telephony which is sweeping across the country. Surely, broad is the gate which leadeth to destruction and many there are who enter thereat.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

POLE TAX ON PREVIOUSLY LICENSED COMPANY.

WE were granted a franchise for twenty-five years, giving us the right to erect and maintain a system of telephones and telephone connections in the streets of the city and to plant such poles and string such wires thereon as were necessary to complete and operate a public telephone exchange system. The manner in which such poles and wires should be placed was provided and we were given the right to regulate our rates within certain limits. In consideration of the rights we obtained, it was provided that we should furnish four telephones to the city free of charge and permit the city to place its fire alarm wires on our poles without compensation. In reliance upon the franchise, which we accepted, we built our telephone system, furnishing the free telephones and the use of our poles for the fire alarm wires without compensation, according to the terms of the ordinance.

What we want to know is: Under the franchise here shown, can the city place a tax upon our poles and the wire used in operating our exchange, other than the regular tax as assessed against other property as a "police regulation"?

THE city cannot lawfully impose the proposed tax. This was decided in the case of *City of New Orleans v. Great Southern Telephone and Telegraph Company*, 40 La. Ann. 41, 3 S. 333, 8 Am. St. Rep. 502. In that case the court said, "The . . . question is, whether, after granting the defendant the authority to construct and to maintain its lines . . . with no other consideration that the furnishing of certain free telephonic facilities to the city,—after the defendant has, at great expense, established its plant, and constructed its lines, and when it has fully complied with all the conditions imposed,—the city can now exact this large additional consideration for the continued enjoyment of privileges already granted.

"If the city can do this now, she could have done it the very day after the defendant had completed its lines, when it had incurred all the expense, and before it had reaped a particle of return. If she can impose a charge of five dollars per pole, she can with equal power impose one of one thousand dollars, and, for that matter, she could arbitrarily revoke the grant at her pleasure.

"Either she is bound according to the terms of her proposition accepted and acted on by defendant, or she is not bound at all.

"Obviously, upon the clearest considerations of law and justice, the grant of authority to defendant, when accepted and acted upon, became an irrevocable contract, and the city is powerless to set it aside, or to interpolate new and more onerous considerations therein. Such has been the well-recognized doctrine of the authorities since the *Dartmouth College* case, 4 Wheat. 518."

INJUNCTION AGAINST INTERFERING WITH TELEPHONE AS INTERSTATE COMMERCE.

THE Northwestern Telephone Exchange Company of Minnesota has begun a suit in equity in the United States Court at Minneapolis restraining the authorities of Winona, Minn., from interfering with the extension, repairs, or renewal of the telephone plant in that place. The Northwestern Telephone Company was established under the laws of the State of Minnesota in 1878. In 1881 the company came into Winona under permission from the city council, which granted a ten year franchise, which was afterwards extended for ten years until 1901. In November, 1902, the city passed an ordinance providing that no company whose franchise had expired could erect or set any telephone poles to support wires in public streets or alleys without the sanction of an ordinance duly passed by the city council, which, it is claimed, could not lawfully prevent the Northwestern Company from extending its business. Since the passage of that ordinance the Northwestern Company has not been permitted to set its poles.

Last September the Northwestern Company made an application to the city council for permission to repair and extend its system in Winona under such reasonable police regulations as the city might care to impose. The application was referred to the street committee, and in November a meeting of the committee and representatives of the Northwestern Company was held and the situation discussed without an agreement, the company objecting to some of the regulations wanted by the committee. Not having since been able to get an ordinance from the committee the company on Saturday made this application to the United States Court, representing that it desires to make an expenditure of \$50,000 on its plant there and that the failure of the Winona council to enact an ordinance was interfering with interstate business and that the failure to allow it to set poles there practically amounted to a destruction of its plant, which represented an investment of \$40,000.

A REHEARING GRANTED.

KANSAS CITY is to be given a rehearing in the suit brought in the Supreme Court of Missouri to require the Missouri and Kansas Telephone Company to comply with an ordinance and furnish telephone service in Kansas City at the rates stipulated by the council. The court ruled several weeks ago that the city had not the power to fix telephone rates, the sole authority being vested in the State. Counsel for the city made a motion for a rehearing, and filed a brief, in which he contends that "the extortion has been committed in a matter purely local, with which the people of the State generally are in no manner concerned. The opinion in this case, if it stands, practically says to the people of Kansas City: 'You must not only await the convening of the Legislature before this matter of local extortion can be regulated,' but further says that, 'as to this matter of purely local concern, the consent of the legislators from Taney County, from Ozark County, from Christian County, and the legislators from other remote quarters of the State, who, by fair presumption, know nothing of Kansas City's needs, must give their consent before the restraining hand of the law can be reached out and laid upon the Bell telephone monopoly.'"

CONGRESS TAKES MEASURES AGAINST DISCRIMINATION.

CONGRESSMAN TAWNEY of Minnesota has secured the passage by a big majority of the following amendment to the postal appropriation bill as a plea against discrimination by the Post-office Department. The amendment reads:

"Provided further, no part of an appropriation shall be expended for telephone service in any post-office where the postmaster is required by order of the Postmaster-General, or otherwise, to use no other telephone service than that of the Bell Telephone Company, or any of the telephone companies connected with, or controlled, in whole or in any part, by said Bell Telephone Company."

CINCINNATI QUESTIONS DECIDED.

AT Cincinnati, Ohio, Judge Nippert, of the Probate Court, has decided that independent telephone companies have the right under the statutes of the State to use the streets of the city. Unavailing efforts to obtain a franchise have been made for months by the Independent companies who have applied to the city authorities.



IN THE OPERATING FIELD.

DECISION IN THE SELF-RESTORING DROP PATENT SUIT.

JUDGE BAKER, sitting in the United States Circuit of Appeals at Chicago, Ill., on April 12, 1904, delivered the following decision in the self-restoring drop patent suit:

The main divide in this case, as presented in argument, lies along the line whether, as appellees insist, Fisk intended the operator to use the plug as a tool with which to restore the drop while the operator was moving the plug to the mouth of the jack, or, as appellant contends, he conceived the idea of having the plug automatically and inevitably restore the drop by the plug's insertion into the jack. The expressions in the patent, "the drop . . . is lifted by the plug as it is inserted in the jack," "the drop . . . is raised by the entrance of the connecting plug (into the jack)," "the drop . . . to hand in front of the jack and be lifted by the plug as it is thrust into the jack (and be held by) a trigger or arm . . . when so raised," leave no doubt in our minds that Fisk contemplated automatic restoration of the drop by the action of the plug during its insertion into the jack.

Did he disclose a practicable means for carrying this idea into effect? "Plug K" of the patent is nowhere specifically described or pictured. This omission and a comparison of the size of the jack-opening with the distance through which the drop must be raised to reach the catch as exhibited in Figure 1, have led appellees to assert that the patent shows no way of restoring the drop through the action of the plug except by using the end of the plug to poke (as one might with his finger) the drop into its latched position before inserting the plug into the mouth of the jack. But the drawings are not required to be working plans; they must be read in connection with the description and claims; and any inferences arising from omissions or inconsistencies in the drawings must yield to a legally sufficient specification. "Many material objects and operations," says Robinson (Vol. 2, Sec. 491), "are so familiar to the inventor and his readers that their specific description, or even an allusion to them, would be superfluous. The law recognizes these difficulties in the way of an absolutely complete description and overlooks the defects which they occasion, . . . though it omits appliances, modifications, or processes which persons skilled in the art would know were necessary and would themselves supply. Though it fails to describe implements and materials that are common in use or methods of construction generally practiced in the arts, it may be complete enough to put before the already trained and informed intelligence of the reader an accurate and entire picture of the invention, from which he can understand it, construct it, and use it as easily as if all these familiar acts and objects were particularly described." The specification calls for a plug of such a form in relation to the form and location of the drop and jack that the mere act of inserting the plug into the jack will restore the drop to its latched position. Plugs with hafts to limit the thrust were common. It seems clear to us that any one who was familiar with existing switchboards and plugs and who on reading Fisk's patent desired to embody the invention in the specific form of Figure 1, would see that the blade of the plug as it was thrust into the jack would not lift the drop into its latched position unless the bent portion of the drop were extended to equal the distance between the latch and the mouth of the jack, and that if the drop were not so extended the haft of the plug should be of a form and size to lift the drop to its latched position. That is, it would be purely a matter of the particular builder's choice whether he used the extension on the drop or on the plug or both.

It is not denied that Fisk's device is useful and novel and that the exercise of the inventive faculty was required in its production. The reference patents are claimed by the appellees to limit the scope of the invention so as to save their device from infringing. Inasmuch as Fisk was the originator of the principle of *restoring the drop by the contact therewith of the plug as it enters the associated jack*, and the deviser of a practical embodiment of that principle, we deem the prior exhibitions of automatic restorations of the drop when disassociated from the jack and accomplished by means *dis-similar to the contact of the plug with the drop as the plug enters the jack*, to be utterly irrelevant to the question of infringement as they are confessedly insufficient as anticipations. If appellees are using Fisk's invention as it is defined in the patent, it is immaterial how much of the prior art they also employ. Appellees' drop is restored from a horizontal to a vertical position; Fisk's from a vertical to a horizontal, according to Figure 1 of the drawings. But in the description and claims there is no limitation upon the position of the drop except that it must be in front of the jack to the extent that the plug will lift it to its latched position as the plug enters the jack.

Appellees' drop contacts with the plug through the cam projection on the drop. We have already stated that we regard it as immaterial whether the contact is effected through having the plug reach up or the drop reach down or both. We therefore find that appellees device responds to the claims of the Fisk patent as we read it.

That Overshiner improved upon Fisk, and, indeed, developed an idea that never occurred to Fisk, is no warrant for using appellant's property without leave.

The decree is reversed, with the direction to enter a decree in appellant's favor for an injunction and an accounting.

LOS ANGELES' FIRST YEAR IN INDEPENDENT FIELD.

MARCH 23 was the first birthday of the Independent movement in Southern California and the opening of the Los Angeles exchange. It now has 9,103 main lines installed and working, 11732 instruments in use, 400 private branch exchange trunks, 101 private branch exchanges and intercommunicating systems connected directly to central, which have from 10 to 300 lines each. A total of 80-300 pair cables enter this exchange making one of the largest main distributing racks in the world. This rack was furnished and equipped by Frank B. Cook, of Chicago, Ill. The growth has become phenomenal and it has been found necessary to arrange for three branch exchanges to take care of the large number of unfilled orders. Peg counts taken on March 12 and 14 show over 95,000 and 99,000 calls, respectively, and at this rate it is possible that 100,000 will soon be taken care of. A large and increasing business is being done, over fifty toll stations being now connected to the city. The toll board consists of a two-position desk and another two-position desk is being installed, three more positions are being added to the main exchange, the ultimate of which is 18,000. The operating staff now is: John Van Lieu, general manager; P. Kerr Higgins, superintendent of equipment and maintenance; Fred Hummel, superintendent of construction; C. C. Craig, cashier; H. L. Edwards, contract department; W. E. Rose, directory department; Mr. Mitchell, exchange manager; Mr. Guthridge, long distance superintendent.

The longest line entering this exchange and working central energy is six miles and gives entire satisfaction; the cable portion is probably four and a half miles long.

A TELEPHONE MAP BILL.

A BILL was passed by the Iowa Legislature on April 6th, which will be of considerable interest to the telephone men of that State. Below is a copy of the bill:

AN ACT PROVIDING FOR THE FILING WITH COUNTY AUDITORS OF MAPS OF TELEPHONE AND TELEGRAPH LINES WITHIN THE SEVERAL COUNTIES IN THE STATE.

Section 1. That on or before the first day of August, A. D. 1904, each telephone or telegraph company owning or operating a telephone or telegraph line, any part of which lies within the State of Iowa, shall file with the several county auditors of the counties within which any part of its line is located, a map of all its lines within said county, except its line within any platted city or town, drawn to a scale of not less than one (1) inch to four (4) miles, on which the location of the line or lines of said company is correctly shown. The map of any line situated upon any highway or street which is the dividing line between taxing districts shall show on which side of said street or highway said line is situated, and shall locate all points at which said line may cross said street or highway. A statement showing the length of pole line in each taxing district of each company shall be filed when no map of the pole lines of such company is required under the terms of this act. A telephone or telegraph company, whose line is situated upon the right of way of a railway, may file, in lieu of the map required to be filed by the provisions of this section, a certificate setting forth along what lines of railway said company's telephone or telegraph line extends. On or before

the first day of March, A. D. 1905, and annually thereafter, like maps, statements or certificates shall be filed with the several county auditors of counties in which any part of said lines may have been extended, constructed, relocated or taken down entirely, during the preceding calendar year, showing the correct location of all such new or relocated lines, and the location of any part abandoned or taken down, as the same existed on the thirty-first day of December preceding. Provided, county auditors of the several counties shall, upon application of any company, owning or operating a telephone or telegraph line in their respective counties, furnish a map or maps accurately showing the boundaries of all taxing districts in said county, and the public highways located within such taxing districts.

Sec. 2. In the event of the failure or refusal of any telephone or telegraph company, owning or operating any telephone or telegraph line not situated upon the right of way of a railway, to file the map required under the provisions of Section one (1) of this act, at the time and according to the conditions named, then the county auditor may cause the same to be prepared by the county surveyor and the cost thereof shall, in the first place, be audited and paid by the board of supervisors of the county, out of the county fund, and the amount thereof shall be by said board levied as a special tax against said company and the property of said company, which shall be collected in the same manner as county taxes and become a part of the county fund.

Sec. 3. This act, being deemed of immediate importance, shall take effect and be in force from and after its publication in the *Des Moines Daily Capital* and *The Register and Leader*, newspapers published at Des Moines, Iowa.

INDEPENDENTS WIN IN POSTOFFICE CONTROVERSY.

THROUGH the Congressional appropriation bill, the fight that the Independent telephone companies, headed by President F. S. Dickson, of the Cuyahoga Telephone Company, of Cleveland, have been waging against the Payne order to bar Independents from the postoffices, has been practically won. The provision is made that the appropriation for telephones shall not be limited to the Bell Company, which means in effect that the Payne order is a dead letter. It was largely due to the work of Senator Foraker, of Ohio, in the Senate, that the point for which he had fought so bitterly was carried by President Dickson. Not only was the aid of Senator Foraker enlisted, but President Dickson called to the support of the Independents a number of other Senators with whom he had influence, and their combined efforts were sufficient to carry the day for the Independents. The result is of more than usual interest in Cleveland from the fact that from the start the plan of battle has been evolved by President Dickson and the leadership has been turned over to him. Hundreds of small Independent lines throughout the middle west in particular looked to him to save the day for them, and he did it. "I want nothing easier than to fight the Bell Company along such lines as that," says Mr. Dickson.

TO PREVENT WIRE HUMMING.

TO prevent humming wires, M. L. Golladay, manager of the Holden, Missouri, Telephone Company, writes that he has found that by using covered or tree wire from the pole to the building in which the telephone is installed, that no trouble will be experienced from the disagreeable humming due to the vibration of telephone wire caused by the wind. He says: "We have used covered iron or tree wire from the pole to the house and have had cases cured by this method where a subscriber could not stay in the house when the wind was in a certain direction. After the installation of the tree wire there was absolutely no vibration."

KANSAS CITY HOME COMPANY PROSPERS.

O. C. SNYDER, manager of the Home Telephone Company, of Kansas City, Mo., says relative to the Independent telephone movement in that part of the country: "We have met with much better success than we ever anticipated in this city. The merchants were not inclined to keep up a double service, and the druggists and physicians led the movement to do away with one telephone, and of course it was the Bell which was thrown out. This move on the part of the druggists and physicians has been followed on the part of the doctors in Kansas City, Kan., the grocers, the undertakers and the liverymen of this city, and a committee has been appointed by the Manufacturers and Merchants Association to investigate the advantages to be offered by the two companies, and then a decision is to be made on one or the other. We can show what we will be able to do. The lawyers

are also investigating the merits of the two systems, with a view of deciding upon one for the future.

"Our board of directors have ordered that additions be made to all the switchboards except that in our East exchange, where an addition had already been ordered, and will be in place by May 1. The additions just ordered will be in place by the middle of June. We have such a demand for telephones that we are away behind.

"We have just opened an Independent toll line to the west, and without any advertising the line has been kept busy ever since it opened, and we have three wires. We will have new connections south, to Paola, Kas., within a few days, and by May 15 our line will be completed from Sedalia, Mo., which will give us communication with St. Louis, Joplin, Pittsburg, and all other Missouri points depending upon that line to reach Kansas City. It is a fact that in Missouri and Kansas the Independent companies have five telephones to one of the Bell company, and we will have connection with all these Independent telephones before a great while."

INDEPENDENT TRUST RUMOR FALSE.

A RUMOR has been circulated by the lay press to the effect that an "Independent Telephone Trust" had been formed, with Henry A. Barnhart, of Rochester, Ind., as its president, and that the new concern would absorb companies and manufacture its own apparatus and do the other things which are trust characteristics. It is not known how this falsehood gained its start, but it must have been that a country editor mistook the object of an Independent telephone association, for those of a trust and worded his item accordingly. The *Evening Sentinel*, of Rochester, Ind., which is the property of Mr. Barnhart, the alleged trust president, says:

"There is no more foundation for saying that the Independent Telephone Association is forming a trust than to say that the Republican and Democratic State editorial associations are trusts. These false reports sent out are originated by agents of the Bell telephone octopus for the purpose of trying to make the public believe that the Independent companies are combining to raise rates. Nothing could be farther from the truth."

SOUTHWESTERN KANSAS TELEPHONE ASSOCIATION ORGANIZED.

TELEPHONE managers representing forty companies in southwestern Kansas and northern Oklahoma, owning 8,000 telephones and 2,000 miles of toll lines, met in Wichita, Kan., and organized the Southwestern Telephone Association. C. C. Vandeventer, of Kingman, was elected president, and H. D. McVay, of Wichita, secretary for one year. An executive committee was elected as follows: C. C. Vandeventer, of Kingman; W. F. Sykes, of Wellington; Alvin Long, of Lyons; R. L. Burns, of Hutchinson, and Frank L. Brown, of Wichita.

EVANSVILLE MUNICIPAL FRANCHISE VOID.

JUDGE W. D. ROBINSON, sitting as special judge in the superior court of Vanderburg county, recently sustained the suit of the citizens of Evansville against the Evansville Telephone Company, and issued a permanent injunction against the stockholders of the municipal company to prevent them from enjoying the telephone franchise given them two years ago by the council. The court ruled that the franchise was null and void because the telephone company's organization violated a statute in admitting preferred stockholders to the directory and in allowing the city officials to become holders of stock in the company. This situation has long been expected locally, and a new company will be projected.

POSTMASTER ACTS AS TELEPHONE REPEATER.

J. T. NANCE, postmaster at Harrodsburg, Ind., says it has been a very common thing for him, for a long time past, to read letters over the telephone to the patrons of the office living in the country; a convenient way to deliver them. He is often asked to answer important letters for them when they are unable to get to town to attend to it themselves.

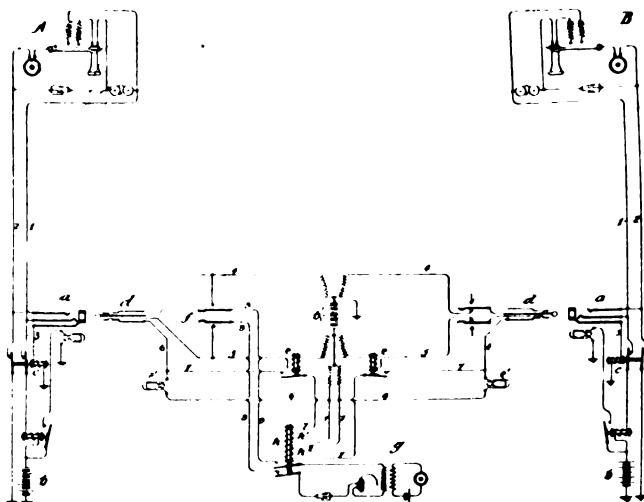
TELEPHONE



PATENTS

SECRET TELEPHONE SYSTEM.

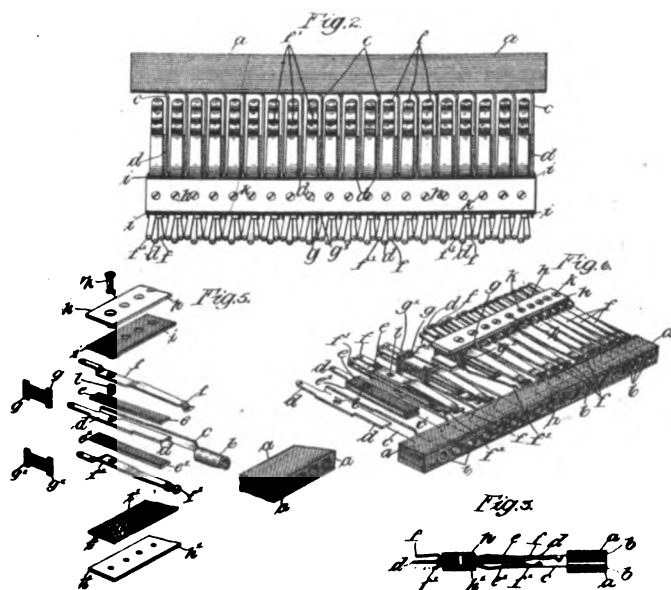
E. H. Smythe, of Freeport, Ill., patents (No. 756,424) an improved telephone cord circuit, and assigns to the Western Electric Company. This invention is shown in the accompanying figure. The object is to provide a cord circuit so arranged that the operator cannot listen in. Mr. Smythe accomplished this inven-



tion by carrying the operator's circuit through a differential relay, *H*. When either receiver is on the hook this relay is excited, the contacts closed and the operator's circuit completed. When both subscribers have the receivers removed the relay is demagnetized and the operator's circuit opened.

IMPROVED SPRING JACK.

M. S. Conner, of Chicago, patents (No. 756,331) an improved spring jack. This jack is illustrated in Figs. 2, 3, 5 and 6. The essential feature of Mr. Conner's invention consists in making the thimble support the rear portion of the jack. This is accomplished by rivetting a horizontal spring to a prolongation of the



thimble and to thus the various jack springs are attached and clamped.

TELEPHONE REPEATER.

J. Trowbridge, Cambridge, Mass., patents (No. 756,436) an improved telephone repeater. The inventor attaches to the button of a microphone an iron armature, around which the line wires are

coiled, and which is placed between the poles of a pair of magnets. Variations in line currents through the coils cause the armature to move in the magnetic field, and consequently to operate the microphone in a manner precisely synchronous to the sound waves which originated the line currents.

TELEPHONE CABINET.

W. B. Altick, of Lancaster, Pa., patents (No. 756,555) an improved telephone cabinet. The inventor provides a cabinet which consists of two semi-circular doors, which slide in a circular groove. The telephone instrument may be located inside of the doors, which may be easily closed, insuring privacy.

ANNUNCIATOR.

A. Carliss, of Chicago, Ill., patents (No. 756,777) and assigns to the American Electric Telephone Company an improved annunciator. This device is a combined annunciator and jack, so arranged that the insertion of a plug will restore the armature of the drop.

IMPROVED PARTY LINE SYSTEM.

B. Stryker, of Washington, D. C., patents (No. 756,296) and assigns to the American Telephone and Telegraph Company an improved party line system. This is shown in the accompanying

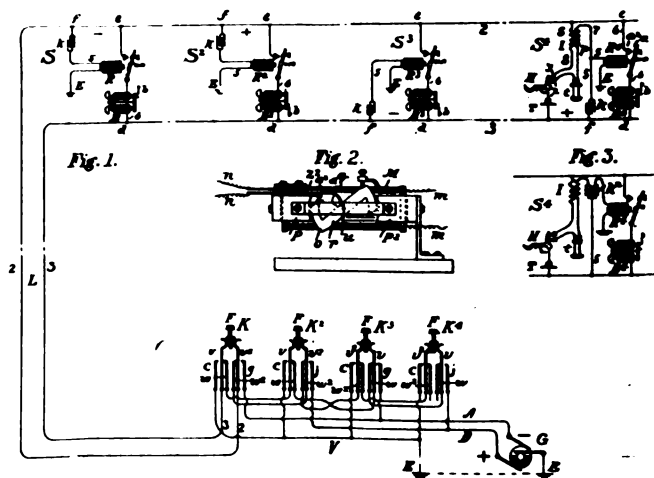


figure. Mr. Stryker's invention consists in providing a sluggish relay which, in series with a condenser, is legged to ground, two stations being placed at each side of the circuit. This relay is sensitive to pulsating currents, and when closed bridges a selective ringer across the sides of the line. It will be seen that this invention differs from that of Thompson and Robes by placing the relay to ground and the bell in a bridge instead of the bell to ground and the relay in the bridge.

SANITARY ATTACHMENT.

H. L. Thompson, Waterbury, Conn., patents (No. 756,543) an improved sanitary attachment for telephone transmitters. This consists in arranging sheets of sterilized paper in a form of pad or book to be conveniently placed in front of the mouthpiece of a telephone.

RECEIVER HOLDER.

G. Königstein, of San Francisco, Cal., patents (No. 756,508) an improved attachment for desk telephones whereby the receiver may be supported in convenient proximity to the listener's ear.

NEW SYSTEM FOR MANILA.

RECONSTRUCTION of the telephone system in Manila is projected. The Philippine Commission is now considering a proposed act which will direct the Manila Telephone Company to install a new switchboard and other modern appliances in the central office and in other portions of the system.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



STORAGE BATTERY CHARGING.—(319.)

We are thinking of putting in a Central Energy Exchange here. There is a 110-volt direct current lighting circuit which works only at night. Could we arrange to charge the storage batteries, which I understand are necessary, from this lighting circuit? If it is practical will you please give me an idea of how, with diagrams? J. TEL. CO.

Storage batteries should be charged for eight hours at their normal charging rate, which depends on the capacity of the battery. A, Fig. 319, shows a charging circuit employing a motor generator for reducing the 110 volts direct current to the proper voltage for charging the storage battery. In this case the storage battery is 24 volts and requires a 30-volt generator. B, Fig. 888, shows the

meter and battery; divide the volts by the amperes, which gives the resistance of the circuit, including that of the voltmeter. Subtract the resistance of the voltmeter, which is always a convenient figure, being 100, 500, 1,000 or 2,000 ohms, for 5, 25, 50 and 100 volts respectively, and the remainder is the unknown resistance.

TO CONNECT OPERATOR'S SETS.—(322.)

Please give me diagram of switching connections for connecting 3-100 sections of Standard Magneto Switchboard so that an operator can handle calls from any board from her own transmitter, without having to use extra long cords, or operator changing her head telephone from one board to another. G. M. L.

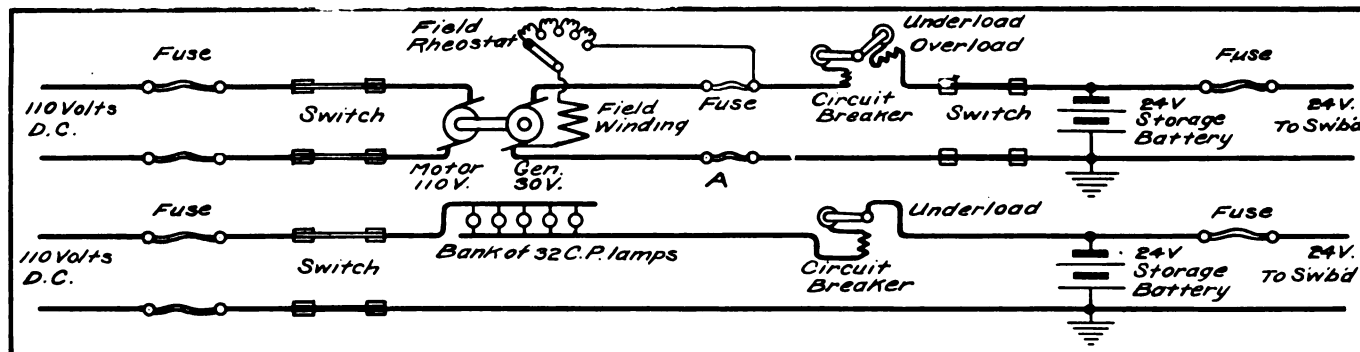


Figure 319.

direct method of charging without the use of machines. A bank of lamps or other resistance is inserted in the charging circuit to reduce the voltage. The number of lamps required depends on the charging rate of the storage battery. Fully two-thirds of the current is wasted in charging a 24-volt battery direct from a 110-volt circuit. The motor generator method of charging is therefore less expensive to operate.

TRANSFER CIRCUIT WIRING.—(320.)

Will not circuit No. 299A, No. 2 jack wiring, in the number of March 19th, 1904, light only one lamp when a plug is placed in or removed from transfer? L. E. M.

The circuit mentioned is incomplete. The wire *a b*, Fig. 320, should be added to give the proper operation. Both lamps will

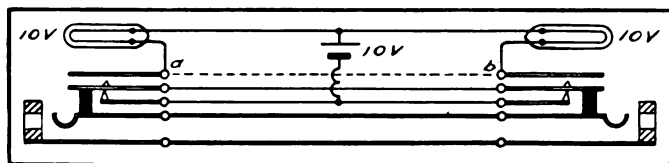


Figure 320.

now light together, one serving as a check on the condition of the other end of the circuit.

PIGNOLET'S VOLTMETER TESTS.—(321.)

Is not there another method of measuring resistances with a voltmeter than that described in Query 300? In the method that I refer to I think that it was necessary to make but one reading of the instrument. F. B.

It is quite possible that you saw a description of a measurement with one of Pignolet's special instruments. This method requires no known resistance and the formula is very simple and easily remembered, being an adaptation of Ohm's Law that these instruments are so adjusted that each division of the voltmeter scale equals one mil-ampere (.001 ampere) and the resistance of the instrument is 100 ohms for each five volts of scale reading. This permits resistance to be easily determined by Ohm's Law that the resistance equals the volts divided by the amperes. ($R = \frac{E}{C}$) To carry this out with the instrument, first measure the volts of the battery used for the test, then ascertain the amperes with the unknown resistance in circuit with the volt-

meter and battery; divide the volts by the amperes, which gives the resistance of the circuit, including that of the voltmeter. Subtract the resistance of the voltmeter, which is always a convenient figure, being 100, 500, 1,000 or 2,000 ohms, for 5, 25, 50 and 100 volts respectively, and the remainder is the unknown resistance.

"B" POSITION.—(323.)

What is a "B" position? I have often seen this term used in connection with large exchanges. C. K.

A "B" operator's position is the terminating position for incoming trunks from other offices. Each trunk terminates in a cord and

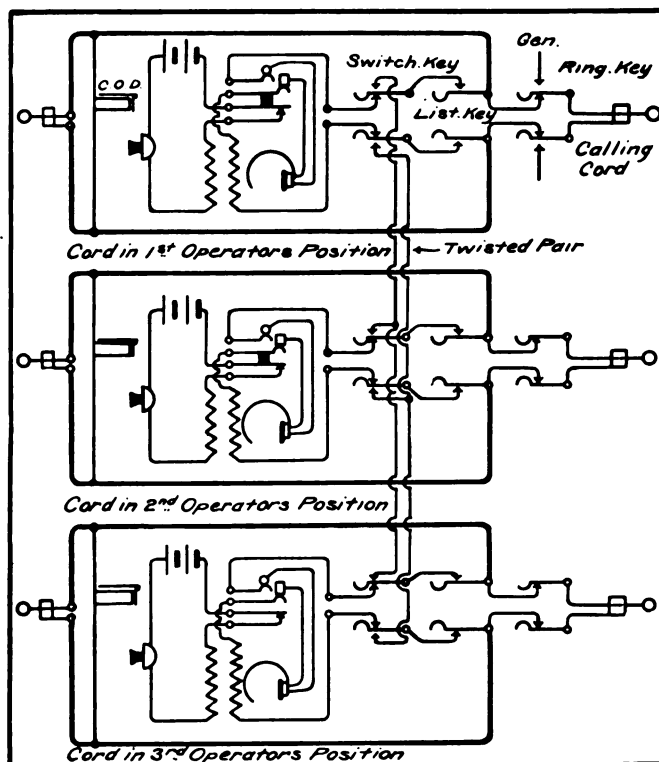


Figure 322.

plug, with which is associated a clearing out signal and a ringing key, but no listening key, since the operator has only to connect the trunk with the required jack of the local subscriber and ring.



THE WEEK'S MESSAGES

FINANCIAL

DANVILLE, IA.—The Danville Mutual Telephone Company has increased its capital stock to \$9,750.

MATTOON, ILL.—The Gayes Mutual Telephone Company of Mattoon has increased its capital stock from \$2,400 to \$4,980.

GREENFIELD, IND.—The Blue Ridge Telephone Company has increased its capital stock with a view of making extensive improvements. The officers are M. C. Young, president, and R. W. Andrews, secretary.

MONROE CITY, IND.—The Wabash Home Telephone Company of Monroe City has increased its capital stock from \$10,000 to \$25,000.

CLEVELAND, O.—During the month of March the Cuyahoga Telephone Company made a net gain of 567 telephones taken at the new rates. This net gain means an average net gain in gross earnings for the year of \$16,748. Of these new telephones put in 366 were in the unlimited class and 75 in the limited class. Since March 6 the company has installed 1,000 new telephones. President Dickson expects to increase the number of telephones in use by the Cuyahoga company to 15,000 before the year is over, and when the company reaches this basis it will show earnings at least 6 per cent. on the common stock.

COSHOCOTON, OHIO.—The Local Independent Telephone Exchange has decided to issue \$22,000 preferred stock to improve and enlarge its exchange.

WOODSFIELD, OHIO.—The Woodsfield Telephone Company has increased its capital stock from \$15,000 to \$25,000.

MILTON, WIS.—The Milton and Milton Junction Telephone Company has increased its capital stock from \$5,000 to \$20,000.

MILWAUKEE, WIS.—The Central Wisconsin Telephone Company of Milwaukee by its president, H. A. Bright, and secretary, E. A. Miller, has increased its capital stock from \$5,000 to \$50,000.

FRANCHISES

SAN BERNARDINA, CAL.—The Home Telephone Company has been granted a franchise in the city of Colton. Under the terms of the franchise the town is to receive 2 per cent. of the gross proceeds after the company has been in operation for five years. The company must expend \$1,000 within six months and \$1,000 monthly until \$5,000 has been put into the system.

BOULDER, COLO.—The city council has been asked for a franchise for an independent telephone system by Charles C. Townsend, of Greeley, who will furnish a bond of \$10,000 and will begin work within three months and complete a system within six months. Mr. Townsend says he has no connection with the Independent Telephone Company of Greeley, and has stipulated that the franchise is annulled in case the Colorado Bell Telephone Company is interested in any way.

GREELEY, COLO.—The Northern Colorado Independent Telephone Company of Greeley has asked the city council of Longmont for a franchise. In case it does not secure a franchise for Longmont it will ask one for North Longmont, and will install an exchange at that place.

ATHENS, ILL.—The Menard County Telephone Company has been granted a local franchise. Preparations are being made to connect with the Interstate Independent Telephone Company at Springfield. An exchange will be established in this city and work commenced soon on toll lines. W. C. Scott is secretary of the company.

INDIANAPOLIS, IND.—At a recent special session of the City Council the Board of Public Works resolution to permit the New Telephone Company to transfer its franchise and holdings to the Indianapolis Telephone Company was approved by ordinance.

WEST STOCKBRIDGE, MASS.—The West Stockbridge Mutual Telephone Company have petitioned the selectmen for a franchise to erect poles and lines on several additional streets from those which their lines now cover, and a hearing will be given at the town room.

PLAINWELL, MICH.—The Norton Telephone Company has presented a petition to the city council for a franchise to construct a pole line through the village.

FLUSHING, L. I., N. Y.—F. H. Snediker, of Jamaica, L. I., General Manager of the New York & Long Island Telephone Company, has asked for a franchise to construct and operate a system in this town.

WEST MILL GROVE, OHIO.—The West Mill Grove Telephone Company has been granted a franchise by the city council. An exchange will be established here with lines running for a mile in each direction, while farmers living at a greater distance will be given connection if they furnish poles and construct the lines. The company will be incorporated at once with a capital stock of \$2,500 and the following officers: Wilbur Rosendale, president; J. P. De Wolfe, vice-president; C. D. Stearns, treasurer, and S. L. Ghaster, secretary.

EUGENE, ORE.—The County Commissioners' Court has granted franchises to the following rural telephone companies: The Farmers' & Merchants' Telephone Company from Junction City to Florence, the Llewellyn Telephone Company from Eugene to Crow, the Dexter & Goshen Telephone Company from Dexter to Goshen.

ELECTIONS

BLOOMFIELD, IND.—The new Home Telephone Company has elected the following officers: Joe Moss, president; Cyrus E. Davis, vice-president; Otto F. Herold, secretary.

MUNCIE, IND.—The Daleville Home Telephone Company, at a meeting held here, elected Grant Isonogel, of Yorkton, president; Richard C. Stone, of Muncie, vice-president; H. Forrest, of Daleville, secretary.

RISEING SUN, IND.—At a meeting of stockholders of the Ohio River Telephone Company, held here, the following officers were elected: C. R. Green, president and superintendent; C. H. North, vice-president; W. M. Green, secretary and treasurer. A semi-annual dividend of 3 per cent. was declared.

WINCHESTER, IND.—The Winchester Telephone Company has elected the following officers: A. L. Nichols, president; P. E. Goodrich, treasurer, and J. A. Brown, secretary.

SOUTH ENGLISH, IA.—An annual meeting of the Keokuk County Mutual Telephone Company was held here recently and the following officers elected: Adam Brower, president; Will Groves, vice-president; Theodore White, treasurer; Chester Mendenhall, secretary.

MAYSVILLE, KY.—The Mason County Telephone Company at a meeting held here elected the following officers: John T. Martin, president; W. E. Piles, vice-president; C. M. Bolinger, secretary and treasurer. The company now has 151 telephones in service, and the annual reports show it in good condition and future prospects flattering.

FALL RIVER, MASS.—At the annual meeting of the Fall River Automatic Telephone Company the following officers were elected: B. D. Davol, clerk and treasurer; E. B. Jennings, Wm. J. Dunn, R. J. Thompson, R. F. Haffenroffer, Jr., P. A. Mathewson, M. Sweeney, Quinlan Leary, Vinton A. Sears, Martin Feeney, R. P. Borden and B. D. Davol.

ROWE, MASS.—The Rowe Telephone Company has elected the following officers: A. P. Goldthwait, president; P. P. Chilcott, vice-president; H. D. Wright, clerk and treasurer.

ALMA, NEB.—The Farmers' & Merchants' Telephone Company at a meeting held here elected R. L. Keester president and general manager. The gross earnings of the company for the year were \$2,100. It now has 250 telephones in operation.

BROOKFIELD, N. Y.—The Brookfield Telephone Company has elected the following directors: C. C. Chandler, N. A. Crumb, H. L. Spooner, O. W. Burhyte, A. D. Chesebro, L. P. Curtis, C. C. Craine, C. A. Crego, Davis Foster, James Sloan, John I. Keith and James Angell. It was decided to extend and improve the system in all ways possible. The company now has about 80 subscribers. It is possible that a new switchboard will be installed.

WOLCOTT, N. Y.—The Rural Telephone Line extending from Butler to Wolcott has just elected the following officers: E. P. Phillips, president; F. Pierson, vice-president; A. J. Ackerman, secretary; D. S. Chapin, treasurer.

KYGER, OHIO.—The Kyger Independent Telephone Company has elected C. A. Rife, president; W. C. Ely, secretary; M. C. Boice, treasurer.

RICHARDSON, TEX.—The Richardson Telephone Company has elected Sam. R. Harben, president; W. T. McKamey, secretary and treasurer. The affairs of the company are in good condition and extensive repairs will soon be made.

MIDDLEBURY, VT.—The annual meeting of the Addison County Telephone Company was held here recently and the following officers elected: John A. James, of Weybridge, president; Allen Calhoun, vice-president; W. H. Davis, secretary; A. T. Calhoun, treasurer. The company also decided to make several extensions.

ROBERTS, WIS.—The Roberts Telephone Company, recently incorporated with a capital stock of \$5,000, has elected the following officers: A. Turner, R. C. Andrus, Geo. A. Turner, David Imrie, and A. J. Walker.

BANGOR, WIS.—The Bangor Telephone Company has elected the following directors: N. M. Elsen, Oscar Hussa, Ira Richardson, J. D. Vaughan, W. H. Page, E. J. Kneen and Hugo Hussa. The secretary's report showed that the company made a net profit of \$600 last year. It was decided to extend several lines this year.

COMBINATIONS

ARROWSMITH, ILL.—Walter Lain has purchased the Arrowsmith Telephone Exchange.

DUNLAP, ILL.—The Dunlap & Alta Telephone Company has arranged to purchase a telephone line west of town to connect it with its system.

SHELDON, ILL.—C. H. Christensen has purchased the Home Telephone Company.

TREMONT, ILL.—The Tremont Independent Telephone Exchange, recently incorporated, has purchased the telephone property formerly owned and operated by A. J. Davis, who has been made president of the new concern. The capital stock of the company is \$20,000. The other officers are Frank J. Davis, secretary and treasurer, and Walter H. Ames, manager.

BLOOMINGTON, IND.—The Bloomington Telephone Company has been sold to the Independent system operating in Bedford, Seymour and Louisville. The price paid was \$20,000. The plant will be rebuilt and a new 20-year franchise has been secured. The present officers of the company are: J. D. Showers, president; W. W. Wicks, treasurer; Walter Bradfute, secretary, and Fred. Shoemaker, superintendent.

GETAWAY, OHIO.—The Getaway Telephone Company has signed an agreement with the Mutual Telephone Company of Huntingdon, W. Va., for toll business. The agreement was signed by U. S. Cox, president of the Getaway company, and D. A. Mossman, president of the Mutual company.

GREENVILLE, W. VA.—The Greenville Telephone Company has purchased the Cam Lowe Telephone line from Hinton to Alderson.

PERSONAL

ALVA J. CARTER, of George, Ia., is at present representing the Monarch Telephone Company of Chicago, with headquarters at Des Moines. Mr. Carter was formerly manager of the Ida County Telephone Company.

LEE FARRELL, general manager of the Cumberland Telephone & Telegraph Company, at Lebanon, Tenn., for the past four years, has been transferred to Pulaski, Tenn. Ed. Fuqua, formerly manager, who has been stationed at Richmond, Ky., will succeed Mr. Farrell.

GEORGE M. FEENEY, who has been with the Holly Manufacturing Company for the past eight years, has tendered his resignation and has accepted the position of solicitor with the Bell Telephone Company.

W. L. HODGES, formerly of the Keystone Telephone Company of Philadelphia and the National Storage Battery Company, has been appointed sales manager of the National Battery Company, with offices at 253 Broadway, New York City. Mr. Hodges was associated with Dr. Louis Duncan at the time the Keystone System was designed.

P. A. PRICE, who has been connected with the Bell Company at Philadelphia, Pa., has resigned his position and accepted one as superintendent of the Warwick Valley Telephone Company, of Warwick, Orange County, New York. The new position will be taken April 27.

S. C. THAYER, general manager of the Bradford County Telephone Company, Towanda, Pa., has resigned. J. J. Thayer, his son, is now acting manager.

C. E. WAKEMAN, in charge of the trolley and telephone service of the Evansville and Princeton (Ind.) Interurban lines, has arranged a new system of telephone service on this road. By the use of a small device the conductors of this line can telephone to headquarters from any point on the road. The telephone instrument is located in the car, and a fish pole is used to reach up to and connect the wire with the instrument.

B. F. WASSON, president of The Farm and City Telephone Company, Clinton, Ill., recently gave a very interesting lecture on the evolution of the telephone before Clinton High School students. Mr. Wasson has charge of the collecting of the exhibits for the World's Fair that will show how the present almost human telephone apparatus has evolved from crude devices. The young people were taken through the telephone exchange and the apparatus explained to them.

MISCELLANEOUS

CHICAGO, ILL.—The Illinois Central Railroad is rapidly perfecting a system of telephone communication between stations on all of its lines. So far, on the Chicago-St. Louis division the innovation has been extended as far south as Clinton.

DIXON, ILL.—Manager H. W. Wilson, of the Farmers' Telephone Company of Lee County reports they now have 600 telephones in operation with four switchboards. The indications are that many extensions will have to be made in the near future to take care of the growing business.

MOLINE, ILL.—The Union Electric Telephone Company has connected up its exchange at Milan with all country lines south of that town. The local exchange is to be enlarged by the addition of a new section to the switchboard to permit the increase of the number of subscribers incident to this extension.

LEBANON, IND.—The Lebanon Telephone Company will install a lamp signal board. A chief operator's desk and information bureau has already been installed. There are now over 850 subscribers and a waiting list of over 150. The work of putting up a mile of aerial cable in the business district has been completed, and an additional mile is being strung in the residential districts. These improvements will foot up to over \$15,000.

WABASH, IND.—The Home Telephone Company is adding another section to their switchboard, which will accommodate 200 additional lines. This company has been growing rapidly in the past few months, and the indications are that the high-water mark hasn't been reached as yet.

BURLINGTON, IA.—The C. B. & Q. Railway Company has installed a telephone system, connecting up the offices of the company with the passenger and freight stations.

LOUISVILLE, KY.—The Louisville Street Railway Company is going to install a telephone exchange for its railway system under the supervision of F. H. Miller, engineer for the company. This will enable motormen and conductors to talk directly from the cars to the central station.

BALTIMORE, MD.—A private exchange of the Maryland Telephone and Telegraph Company has been installed in the public school administration buildings. The exchange connects the twenty-three group centers and the five high schools directly with the administration buildings.

GRANT, NEB.—Perkins County is now able to talk with all towns within forty miles by means of the telephone. This makes a great difference to the ranchmen, who live so far from town and were formerly compelled to make long drives where they can now telephone.

ALTAN, N. Y.—The Tyrone Telephone Company, of Altan, commenced service in February, 1904, and now has 50 subscribers served by two exchanges. It supplies service to the towns of Altan, Bradford, Tyrone, Weston and Dundee. The capital stock of the company is \$2,500. The officers are as follows: E. W. Bigelow, Altan, president; F. T. Kendall, Altan, vice-president; L. N. Howell, Tyrone, secretary; D. S. Crawford, Tyrone, treasurer; E. D. Backer, R. F. D. Dundee, manager.

SYRACUSE, N. Y.—The Independent company here will install a new common battery board as soon as possible. The service has outgrown the present board, and as there are a large number of patrons desiring connection every effort is being made to add to their convenience and expedite the service.

CENTREVILLE, PA.—The Home Telephone Company of this town is now in a position to handle their service in first-class style. Free connection is made with the towns of Brownsville, West Brownsville, Bridgeport, California, Coal Centre, Charleston and Lock No. 4. Toll service is had over the lines of the Federal Company.

UNIONTOWN, PA.—Manager C. A. Berg reports that the Tri-State Telephone Company has secured 47 new subscribers in Uniontown and 37 in Connellsville. Enlargements will be begun at once of the exchange at Uniontown. An exchange is being installed at New Salem, and a toll line is being projected for Cheat Haven.

UNDERGROUND

WATERBURY, CONN.—The Southern New England Telephone Company has submitted a plan to the Board of Aldermen to install a complete system of underground conduits for its main lines in this city.

CORTLAND, N. Y.—The Empire State Telephone Company has asked the City Council for a permit to construct and maintain a conduit system in this city.

NEW COMPANY NOTES.

CAMDEN, ARK.—The Ouachita Telephone Company of Ouachita, Camden County, has recently been incorporated, with a capital stock of \$25,000; no bonds. This company has been in business several years, and at present has over 200 subscribers but expect to have over 400 connected by the end of the year. The following officers were elected: M. A. Joy, president; H. P. Lineal, vice-president; R. E. Rechie, secretary.

FULTON, IND.—A new telephone company has been incorporated here with a capital stock issue of \$5,000. Telephone service will be given to the towns of Fulton, Twelve Mile, Rochester and Kewana. The officers are Chas. Becker, president; E. E. Jackson, vice-president; H. L. Becker, secretary and manager; William Troutman, treasurer.

SULLIVAN, IND.—The Sullivan Telephone Company, of Sullivan, Sullivan County, has been incorporated with a capital of \$50,000; no bonds. This company has at present 500 subscribers, but when the contemplated extensions are made they will reach over 800. The following towns are to be connected with: Shelburne, Farmersburg, Hymera, Coalmont, Star City, Cass, Dugger, Oaktown, New Lebanon, Merom, Riverton and Palestine, Ill. The officers are: President, C. J. Sherman; secretary, J. S. Bays; treasurer, G. R. Dutton; manager, E. L. Hardin.

LINN, KAN.—The Linn Rural Telephone Company of Linn, Washington County, which has been giving service here, has been incorporated with a capital stock of \$5,000. A number of extensions to the system are contemplated which will increase the number of subscribers from 118 to over 300. The officers are: R. W. Mainty, president; F. J. Randall, vice-president; H. J. Meierkord, secretary and manager.

ZUMBRO FALLS, MINN.—The Zumbro Falls Farmers' Telephone Association of Zumbro Falls, Wabash County, has incorporated with a capital stock issue of 75 shares at \$35 each. Connection will be made at Lake City with the Deville Telephone Company and also with the Hammond company. C. F. Anding has been elected president; J. J. Sprienger, vice-president; A. H. Lugg, secretary, and A. Robinson, treasurer. The directors are J. J. Sprienger, B. M. Desney, F. B. Roberson, John Brinkman and James Boss.

OREGON, MO.—The Oregon and Forest City Telephone Company of Oregon, Holt County, has incorporated with a capital of \$10,000; no bonds. The officers are: President, D. M. Martin; secretary, treasurer and manager, M. R. Martin. At present there are two exchanges in operation at Oregon and Forest City with 350 subscribers. The system is being extended to the towns of Curyons and Forbes. The rates are scaled from \$2.50 to \$1 per month according to style of service.

VERDIGNE, NEB.—The Verdigne Telephone Company, of Verdigne, Knox County, has been incorporated with a capital of \$2,000. J. B. Bates, of Verdigne, was elected president and manager; E. L. Pischel, of Pischelville, vice-president, and George Greenberg, of Verdigne, secretary and treasurer. Telephone service will be given by this company to Verdigne, Armstrong, Ruth, Knoxville, Dorsey, Pischelville and Lynch. The rate is to be \$1.25 a month.

PONDCRECK, O. T.—The Rural Telephone Company of this place has incorporated, with a capital of \$5,000. At present there are 100 subscribers, but when the extensions to the system are completed service will be given to over 200 patrons. Connection is had with the surrounding towns by the co-operative free service system. H. F. Wilkers is president and S. D. Milion, secretary and treasurer.

CONSTRUCTION

ELLSWORTH, ILL.—The Dawson Township Telephone Company of Ellsworth is planning to construct a new line to Cooksville.

LIBERTY, ILL.—About 80 farmers who are stockholders in the Liberty Farmers' Telephone Exchange will build a line from Liberty to Columbus, Coatsburg and Camp Point.

SULLIVAN, IND.—The Sullivan Telephone Company will construct a copper metallic line from Sullivan to Vigo County line, where connections will be made with lines of the Citizens' Telephone Company of Terre Haute.

CAMDEN, ME.—A meeting has been called here for the telephone committee to perfect the organization of the Independent company, to be known as the People's Telephone Company, to give service to Rockland, Thomaston, Rockport, Camden and Warren.

HILLSDALE, MICH.—The Farmers' Telephone Company is constructing a line from West Hillsdale to Hillsdale.

BEMIDJI, MINN.—The Iron Range Electric Telephone Company is making a number of improvements to its local exchange. It is installing a selective system and will make Bemidji the central office for all long-distance business on the company's lines.

LESEUER, MINN.—The Farmers' & Merchants Telephone Company is making preparations for extensive additions to its system this summer.

MINNEAPOLIS, MINN.—Two crews of linemen are now stringing wires for the La Crosse line of the Twin City Company. The line is beyond Hastings and will be in operation about July 1. The Willmar line is under way and will be pushed to completion as rapidly as possible. A general extension of the service beyond Willmar is planned for the fall.

MONTGOMERY, MINN.—The Cannon Valley Telephone Exchange of this city will construct a farmers' telephone line to St. Thomas.

REDWOOD FALLS, MINN.—The Redwood County Rural Telephone Company will construct a line from Wabasso and install exchanges at Springfield and Sanborn.

ROTHSAY, MINN.—The Rothsay Telephone Company has decided to build lines to Manston, Stod and Burau.

LA BELLE, MO.—The La Belle Telephone Company is busily engaged in putting in new telephones and constructing new lines both in the town and surrounding country. G. Kendrick and A. Bradshaw, the present owners, appreciate the wants of the public and are doing their best to accommodate the rapidly growing number of patrons.

NATCHEZ, MISS.—The local telephone company expects to complete the reconstruction of its aerial lines within the month. There are at present three construction crews at work in the city. The lines to Kingston will shortly be completed. Manager Lacey expects to double the business with the increased facilities and better service as will be possible with the new metallic circuits.

LINCOLN, NEB.—Bill Bros., who have just established the new Independent exchange at this place, are commencing to build an exchange in Sioux City and are planning to connect Sioux City and Lincoln by an Independent long distance line.

PLATTSMOUTH, NEB.—The Plattsouth Telephone Company has a force of men at work at Louisville putting up poles and stringing wires for a farmers' line in that vicinity.

PONCA, NEB.—The South Creek Telephone Company will construct a line from Ponca to Martinsburg.

CLYDE, N. Y.—Ward Syron is projecting a telephone line south of this village for the benefit of farmers. In case he secures a sufficient number of subscribers a line will probably be built by the Wayne County Telephone Company.

CORTLAND, N. Y.—The Home Telephone Company has decided to install a new multiple switchboard at the central office. The company now has 1,100 subscribers.

EARLEVILLE, N. Y.—A sufficient number of subscribers has been secured at Erieville to warrant the Earleville Telephone Company extending a line to that place.

OSWEGA, N. Y.—The directors of the Ontario Telephone Company, at a special meeting, sanctioned the expenditure of a large amount of money for the construction of several farmer lines this summer to secure and construct connection with Rochester, Buffalo, Fair Haven, Williamstown, Wolcott, Sodus and Red Creek. The company has 800 telephones in service in this city.

WOLCOTT, N. Y.—Easton and Phillips are erecting a telephone line from Wolcott to Rose.

KILLBUCK, OHIO.—The Killbuck Telephone Company has decided to construct several new lines and reconstruct their old lines, making them copper metallic circuit.

GRESHAM, PA.—The farmers in this vicinity are discussing the question of constructing a co-operative telephone line.

BOOK NOTICES

Any book herein reviewed will be sent postpaid by THE AMERICAN TELEPHONE JOURNAL Book Department on receipt of quoted price.

PROCEEDINGS OF THE EIGHTH ANNUAL CONVENTION OF THE INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, held at Atlantic City, September 2, 3, 4, 1903.

This volume is the report of the last proceedings of the International Municipal Electricians. It differs from the transactions of other scientific societies chiefly in that the proceedings were conducted orally. Each member proposed various topics for discussion, presumably questions in which he was particularly interested, and at each of the meetings, informal discussions were held upon the subjects suggested. Among the questions discussed were those of the methods and precautions to be observed in the construction of high tension circuits, the best methods of arranging transformers, and the use of the telephone and telegraph as time savers. As expressions of opinions of practical questions, the volume is interesting and valuable.

TRADE NOTES

THE SWEDISH-AMERICAN TELEPHONE COMPANY wishes to state that the recent decision on self-restoring drop patents does not apply to any of its apparatus.

THE F. BISSELL COMPANY, of Toledo, Ohio, has designed a cable sheath knife which fills a long felt want in cable construction work. The knife, a picture of which appears on one of the advertising pages of this issue, is well made and strong, and is a great convenience. The cut also explains graphically the method of using the tool when stripping a cable.

COUCH & SEELEY COMPANY, of Boston, Mass., has just issued a completely revised and improved catalogue. This pamphlet is descriptive of the apparatus manufactured by the Couch & Seeley Company, comprising receivers and transmitters, complete substation outfits, intercommunicating telephone sets and circuits, together with a full line of switchboards. The book is artistically and well gotten up and is a telephonic compendium well worth having.

THE AMERICAN ELECTRIC TELEPHONE COMPANY has issued a booklet describing the Leich party line system. This little brochure is devoted to a description of the party line system which this company advocates. It is a four party line selective system, the selection being accomplished by using coils respondent to different frequencies and supplying the substation apparatus with an impedance in such a manner that one frequency will ring one bell and the other frequency the other bell. Its title is "Selective," and it contains much information and some figures that would be valuable to the manager.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has recently completed the installation of an intercommunicating telephone system in the City Hall, Chicago. The instruments are its well-known desk telephones with long distance transmitters and double pole adjustable receivers in connection with metallic jack plug-switches enabling any one station being called directly from any of the others. Any number of pairs of instruments may be used simultaneously without interference. The plug switches and wiring are full metallic circuit, which enables ordinary annunciator wire cable to be used without any annoyance from cross-talk.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, N. Y., has recently brought out a new automatic switchboard signal. The signal has, aside from many excellent constructional features, the special advantages of being adaptable to either common battery or magneto systems. The switchboard, for which this signal was designed, when used on magneto systems, increases the efficiency and reduces the cost of operation and maintenance. By adding a condenser in the ringing circuit of each telephone this system is changed into automatic calling, making it equal in operation to a common battery system. By replacing the magneto with common battery telephones, and making slight alterations in the signal connections the system is changed to complete common battery. The signal normally shows black, but when energized the armature is attracted and the disc is raised, bringing the uncolored aluminum surface into view. This makes a very distinct and easily distinguishable signal. The company will be pleased to furnish any further information in reference to this signal upon request.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—Very liberal telephone franchise in hustling Western town of 5,000 population. For particulars, address I. S. MAHAN, Le Mars, Iowa. 172

STOCKS FOR SALE.—Thirty-three (33) pounds of Michigan (Bell) Telephone Stock, a very effective steel engraving on each certificate. Would make exquisite wall coverings for a telephone man's den. I ask for this only \$5.00 in Confederate money. First come, first served. Address,

HELAND LOOM,
Nashville, Tenn. 999

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

THERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid.

5M Large Size, \$2.50. *5M Small Size, \$2.25.

Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, giving samples and particulars.

We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL GILDART BROS., Albion, Mich. 168

WANTED—Second-Hand Telephone Apparatus, Central Energy and Magneto Switchboards, Magneto Bells, Telephones, Transmitters, Cable Terminals, Cross Connecting and Distributing Racks, Ringing and Charging Generators. Write immediately, price, condition and make. "C. E. W.," 17 S. Elizabeth street, Chicago, Ill. 167

WANTED—A competent shopman who can lay out switchboard work according to diagrams given him, and who can act as foreman of repairs in small shop. Address Box 173, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 173

POSITION WANTED.—Have had extended experience in engineering, construction, equipment and management of Bell and Independent exchanges. Graduate Electrical Engineer. Address Box 163, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 163

WANTED—Position as Wire Chief in large common battery plant. Thoroughly reliable, experienced and hard worker. References furnished. Address, Box 170, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 170

WANTED—Party with \$10,000.00 to buy one-quarter interest, or \$20,000.00 for one-half interest and take management of well established telephone system, exchanges and toll lines. Great sacrifice, account of sickness. Address Box 169, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 169

POSITION—Energetic technically educated young telephone man desires managership of exchange of about 500 subscribers. Can operate economically and please subscribers. Will be at liberty May 1st. Can arrange to go to any good opening. Address, Box 160, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 160

WANTED—Position by combination switchboard man and cable splicer as traveling inspector for large company to look after small plants. References given. Address, Box 171, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 171

WANTED—Permanent position by Telephone man with seven years' experience in construction and maintenance of local and long distance. References furnished. South or Southwest preferred. Address Box 161, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 161

HAVING POLE YARDS

with competing railroad connections is an immense help in getting cars.

That's the reason we can ship Poles promptly. (Another reason next week.)

Write us for prices—wire, if you're in a hurry.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Empire Building.**

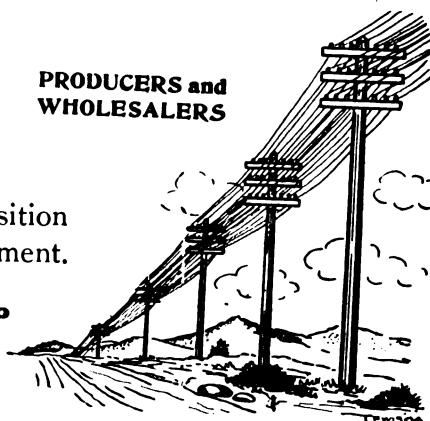
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

PRODUCERS and
WHOLESALEERS



"From the Stump
to the Line."



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock
Prompt Ship-
ment.



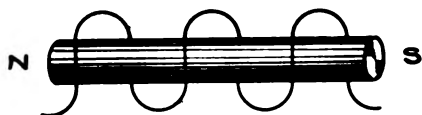
**LONG
POLES
A
SPECIALTY**

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



THE POLES

of a magnet have to be magnetized to attract.

OUR POLES

attract on their merits alone. Write us now, telling us what you are going to build, and we'll tell you the poles you need and give you attractive quotations.

Sand Point Cedar Co.

SAND POINT, IDAHO

The Valentine-Clark Co.

Bag to announce to users of . . .

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

BATTERIES.

Burnley Battery Co., Painesville, Ohio.
Electric Appliance Co., Chicago, Ill.
Nungesser Electric Battery Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

BLANKS, BOOKS AND FORMS.

Telephone Printing Co., Defiance, Ohio.

BONDS.

J. W. Middleton & Co., Chicago, Ill.

BRASS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

BOOTHs.

Yesbera Mfg. Co., Toledo, O.

CABLES.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbing's Sons Co., John A., Trenton, N. J.
Standard Underground Cable Co., Pittsburg, Pa.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CABLE HANGERS.

Bissell Co., The F., Toledo, O.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

National Telephone Supply Co., Cleveland, O.
Standard Underground Cable Co., Pittsburg, Pa.

CABLE SLEEVES.

Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.

CARD INDEX SYSTEMS.

Telephone Printing Co., Defiance, Ohio.

CIRCUIT CLOSERS.

Garton-Daniels Co., Keokuk, Ia.

CLIMBERS.

Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

CONDUITS.

American Conduit Co., Chicago, Ill.
American Vitritified Conduit Co., New York.
Camp Co., The H. B., New York.
Gest, G. M., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Standard Vitritified Conduit Co., New York.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.

CONNECTORS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.

CONTINUED ON PAGE 31.

ECONOMY AND SATISFACTION?

**Use the Novelty Cable Sleeves.
Pot Heads and Y Branches.**

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

**New Haven
Novelty Machine Co.,
ELM AND STATE STS.,
NEW HAVEN, CONN.**

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK**

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

ADVERTISERS' DIRECTORY—Continued

Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.
MEASURING INSTRUMENTS.
Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

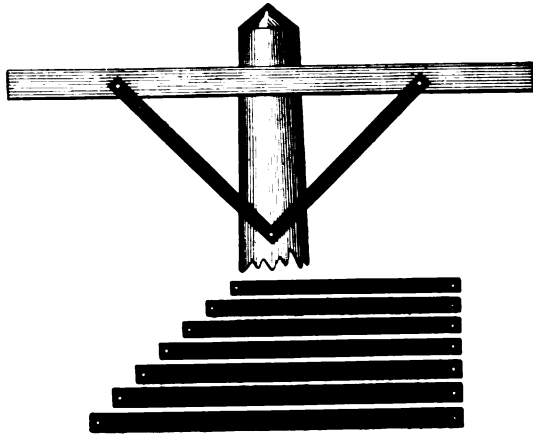
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

PLAIN

JAPANNED

GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

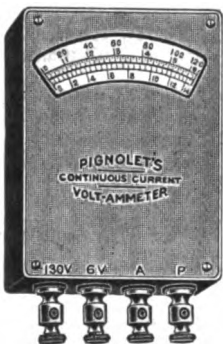
WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

**Insulated
Electrical
Wires and Cables**



**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.
TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

Agencies and Branches
**CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

CEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. - MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Cost of Construction Reduced
By Purchasing Chestnut Telephone
POLES and POSTS
From FRANK MULLEN, Ewing, IND.
Reasons Why for the Asking

LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES
For Special Use Carried in Full Stocks and
Sold at Reasonable Prices
THE MEDORA MILLING CO.,
MEDORA, INDIANA

Oak Insulator Pins and Brackets

Direct from North Carolina's immense
Forest to you.
Orders filled at once; no delays, no "cuss-
ing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality . . .

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG,
INDIANA.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. CHURCHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:

Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

P
O
L
E
S

FRANCIS
BEIDLER
& CO.
459-519 W 22d St.
CHICAGO, ILL.

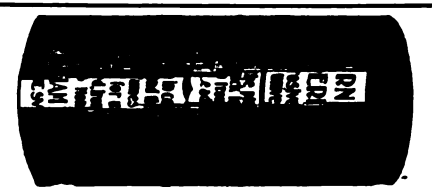
Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ♣ ♣ ♣

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO



Do you always mention the


American Telephone Journal

when writing to advertisers? It will be
appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross
ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

LEWIS LUMBER & MFG. CO., HATTIESBURG, MISS.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR** :: ::
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.



P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

The James A. Spargo Wire Co.

Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.

Rome, N. Y.

Keeling & Ridge Co.

General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 851-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

W. H. CRUMB & COMPANY,

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

. . . Plans, Specifications and Estimates Promptly Furnished . . .

Meritorious Independent Telephone Enterprises Financed.

1263 Monadnock Bldg, CHICAGO, ILL.

**WESTON STANDARD
PORTABLE
DIRECT READING**

Voltmeters, Ammeters, Millivoltmeters, Voltmeters
Milliammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

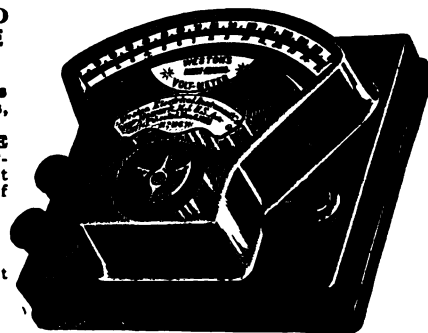
Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Linemen's Outfits

Construction Tools

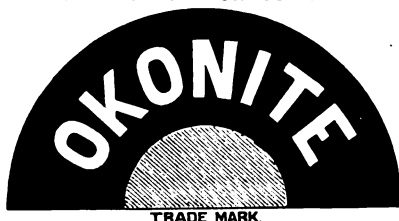
Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS

87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION



1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION

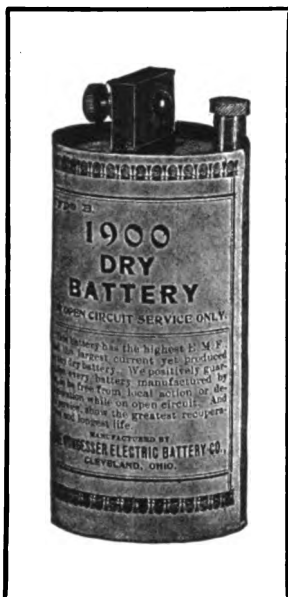
The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

**WILLARD L. CANDEE, }
H. DURANT CHEEVER } Managers**

**GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary**

THE "1900" DRY BATTERY



Adopted by many of the largest Contracting and Operating Companies.

ALWAYS READY.

RELIABLE and STRONG. We guarantee it.

LONG LIVED. (From 6 to 18 months.)

Made especially for Telephone use, but adapted to any kind of bell work.

THE F. BISSELL COMPANY

TOLEDO, O.

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

**39-41 Cortlandt Street,
NEW YORK.**

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

An Ad

in a weekly paper reminds the purchaser fifty-two times a year; in a monthly paper, but twelve times.

16 to 1

is a dead issue, but

52 to 12

is not. It is our issue.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

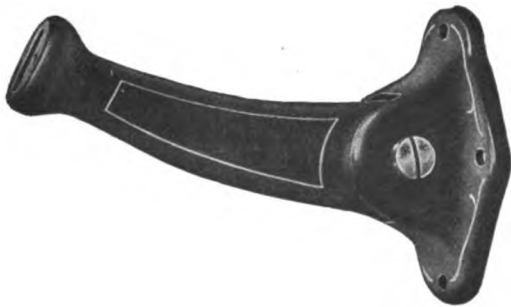
13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

WE HELP TO MAKE

A Good Telephone



ADDRESS "BARRARM," CLEVELAND



You Need a Sign!

if you want to double your toll receipts. And when you buy a sign, you want the best, for it pays. Our signs are enameled iron, fine appearance and wear for years. Now, why don't you send us an order to-day? Write us for prices and description, anyway.

Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Fostoria Electric Supply Co., Fostoria, Ohio.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

STATIONERY.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.

National Battery Co., N. Y. City.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.

Ericsson Telephone Co., N. Y.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.

Automatic Telephones


Privacy Promptness

Precision Profits

Automatic Electric Co.,

Chicago, U. S. A.





**Experience
is a wise teacher**
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

4 MOST

4 EVER

Leich

4

Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

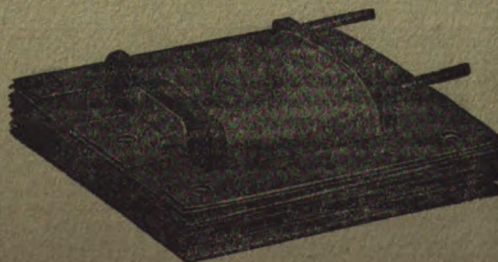
OR

MAGNETO

American Electric Telephone Company



**SELECTIVE
IMPEDANCE
COIL**



**CHICAGO
ILL.**



THE AMERICAN TELEPHONE JOURNAL

CONTENTS:

The Telephone Scout

By Geo. E. Frost

Impedance and Retardation—Article V.

By Arthur Vaughan Abbott.

Keeping Exchange Records

By R. S. Bayley

Receiving Copy by Telephone

How to Make a Sensitive Galvanometer

The Operating Field:

A Cumberland-Evansville Subterfuge

The Utica, N. Y., Home Co. Gives Free Toll Service

Trunk Line Agreement in Wayne County, New York

Principles of Protective Devices

Rapid Justice by Telephone

Telephonic Progress in Nova Scotia

American Telephone Journal Indices for Vols. 6, 7, 8

Results of Competition

W. H. Clapp Goes with Independents

Compulsory Connections in Arkansas

Editorial

Patents—Queries

The Week's Messages—Trade Notes

WANT ADS. PAGE 288.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—APRIL 30, 1904—CHICAGO Number 18

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves.
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DURIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

New Haven
Novelty Machine Co.,
ELM AND STATE STS.,
NEW HAVEN, CONN.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK ❖ ❖ ❖

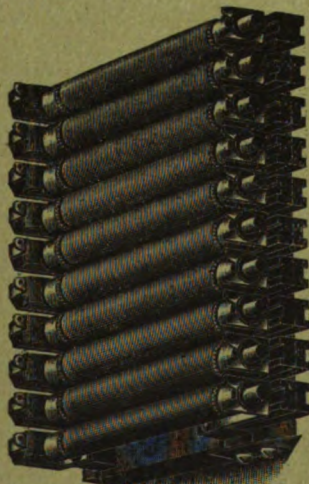
Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

COOK PROTECTORS STANDARD



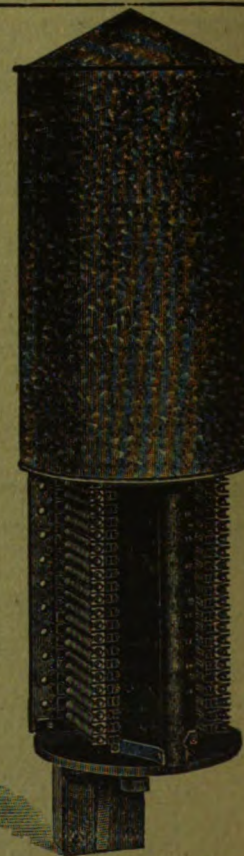
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS.—Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

EXTRA POWERFUL

There is always something new under the sun.
Now it is our No. 36 X-P Type Telephone.

It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

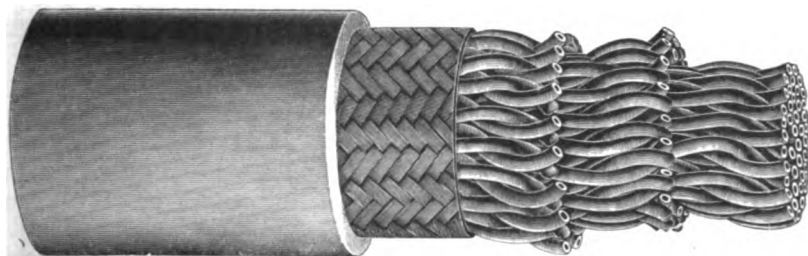
We will tell you more about it if you ask.

ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.



Manufacturers of

"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO,
IND.

SPECIAL

**For a limited time we will sell Series
Wall Telephones at the lowest price
on record. Every telephone guaran-
teed for five years. For particulars,
write us.**

**EASTERN TELEPHONE MFG. CO.,
WEST CHESTER, PA.**





**HIGH-CLASS
TELEPHONE
APPARATUS**

FOR
ALL KINDS OF SYSTEMS

We can mail Bulletins
on the type of apparatus
you are interested in.

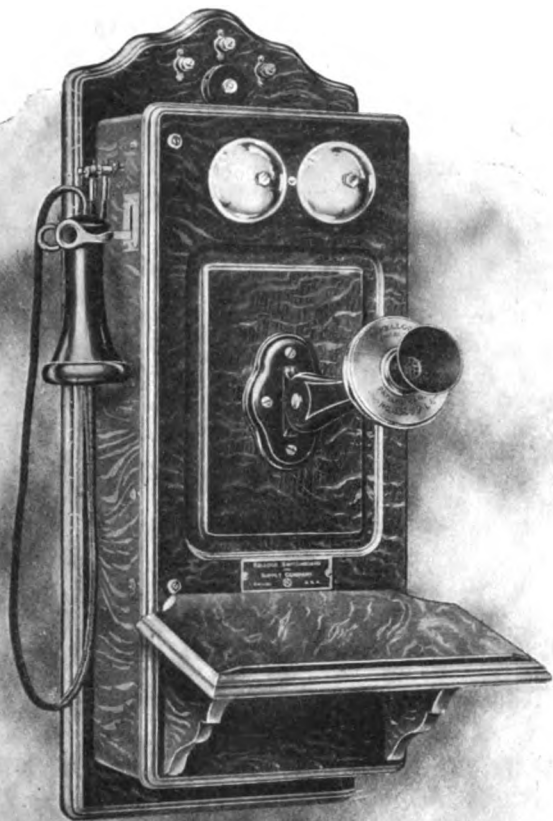
**STROMBERG-CARLSON
TEL. MFG. CO.**

Gen'l. & Eastern Office: Sales Department:
ROCHESTER, N. Y. CHICAGO, ILL.






Kellogg Magneto Telephones

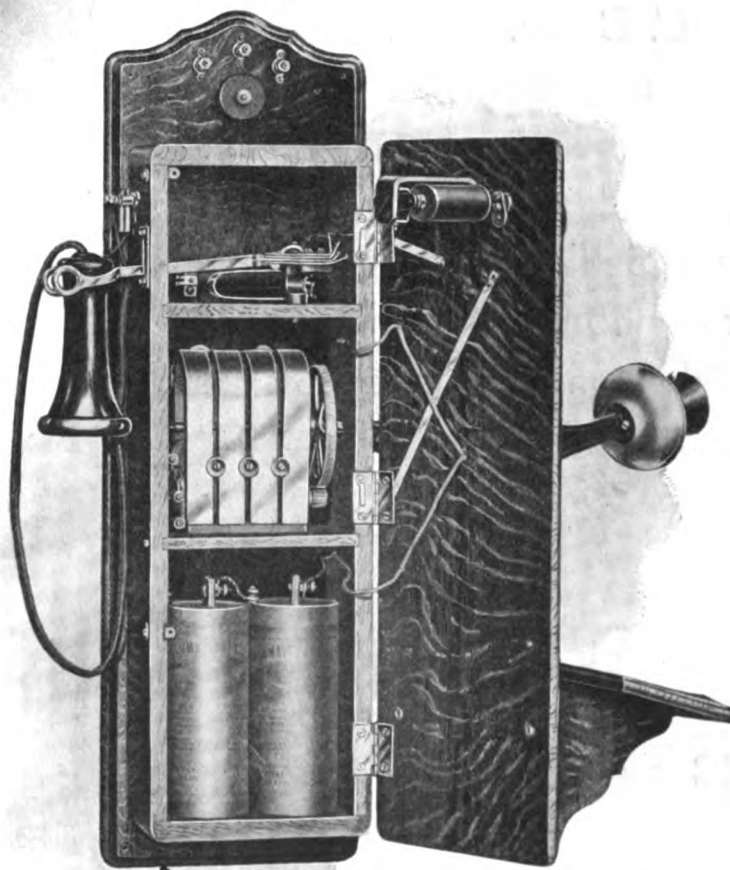


ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

*They are remarkably
durable, compact and
of handsome design.*

*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**
GREEN AND CONGRESS STS., CHICAGO



Electric Building . . . Cleveland
Keystone Telephone Building, Philadelphia

WE WIN!!

Self-Restoring Drop Patent Suit

DECIDED IN FAVOR OF THE
Western Telephone Mfg. Co.

This suit was begun about 8 years ago, and is the *most important case* affecting the patents on independent telephone apparatus. It involves nearly every company in the business.

The suit was against the *American Electric Telephone Co., P. C. Burns, et al.*, and was decided Tuesday, April 12, 1904, in the *United States Circuit Court of Appeals !!!* at Chicago.

The defendants are found to be infringers, and the Court granted an injunction prohibiting the manufacture of all Mechanical Self-Restoring Drops; except those made by the Western Telephone Manufacturing Co., or its predecessor, the Western Telephone Construction Co. An accounting for all Drops used also was ordered.—*This decision is final.*—Write to us for a Copy of the Decision.

WESTERN TELEPHONE MFG. CO.,

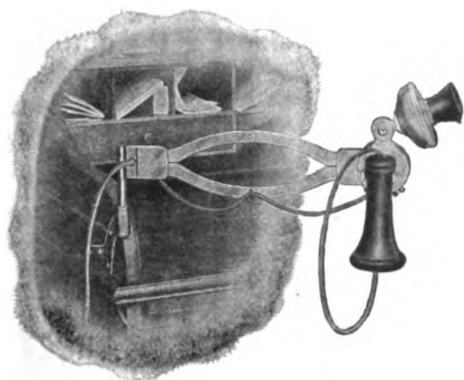
42 W. Jackson Blvd.,

CHICAGO, ILL.

THE "PIONEER INDEPENDENT TELEPHONE FACTORY."

SHORT TALKS ON THE ADJUSTAPHONE

No. 2—The Extension Arms



Next in importance to the Switch-hook is the purely mechanical portion of the instrument—the set of toggle-arms or levers.

The Levers Won't Wear Out

These levers are punched from the best grade of sheet steel, and are then properly hardened.

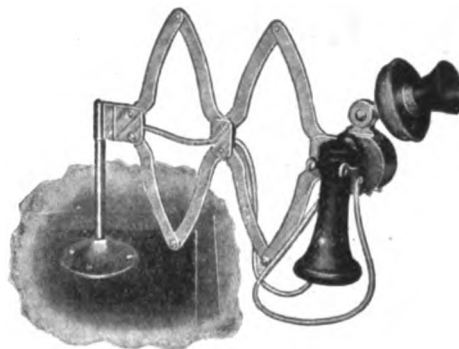
The principle is that of the "lazy-tongs," with the arms geared together to produce a parallel motion.

These Arms Form Absolutely No Portion of the Electrical Circuit

All exposed parts of the ADJUSTAPHONE are finely polished, and nickel-plated on copper, producing a finish at once handsome and durable.

All connections are made through cords leading from the switch-hook box. These cords are looped through eyelets fastened to the arms, to prevent their being jerked from their connections.

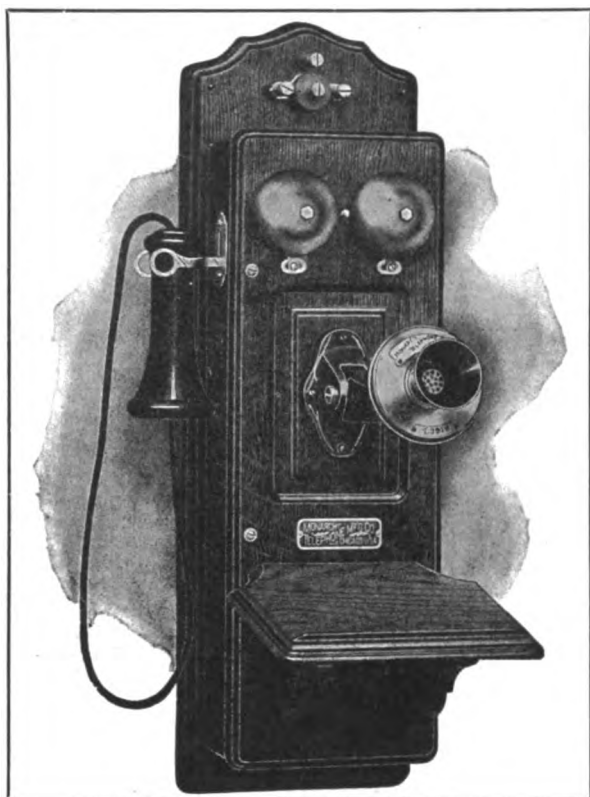
But we can show you all these points in a much more convincing way—just send for some ADJUSTAPHONES which will be sent on FREE TRIAL—equipped AS YOU PLEASE, with ANY TRANSMITTER and RECEIVER, for use with ANY SYSTEM.



TELEPHONE DEPARTMENT

CHICAGO WRITING MACHINE CO.

105 WENDELL STREET, CHICAGO



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

**We Have Created a
Mistaken Impression
IN THE MINDS OF SOME.**

Our product is not confined to that
"perfection in the art"

The Pendent Telephone

We run to capacity daily, and manufacture every style and class—but only one grade, the best—of 'phones, boards and accessories.

We claim first place in important particulars, and decline second place to any; a trial carries conviction.

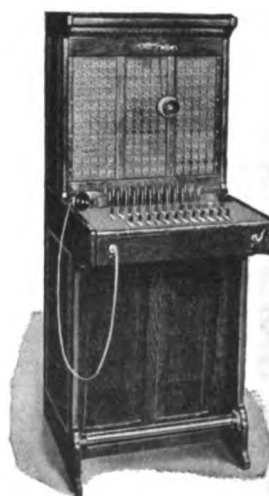
So don't foster the idea that because we are so evidently and justly proud of **THE PENDENT**, we do nothing else but make it and talk about it.

**THE
Vought-Berger Company**

MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS AND APPLIANCES

LA CROSSE, WIS.

IT'S OUR BUSINESS to convince you that in our new type EXPRESS BOARD



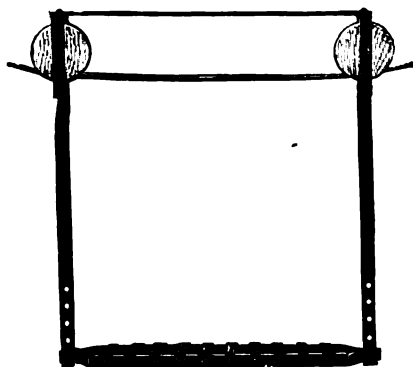
*We have reached
the acme of*

**Electrical and
Mechanical
Perfection**

*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS



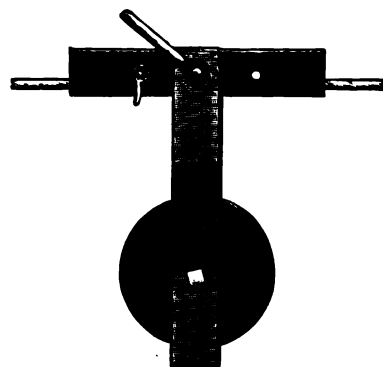
"Ready" Cable Car

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.....	36	Ingram-Richardson Mfg. Co.....	11
American Electric Teleph. Co....	40	Index of the Technical Press.....	—
Am. School of Correspondence....	10	Inland Steel Co.....	32
American Vitrified Conduit Co....	39	International Telephone Mfg. Co.	8
Automatic Electric Co.....	37	Keeling & Ridge Co.....	34
Barr, W. J., Mfg. Co.....	31	Kellogg Switchboard & Supply	5
Beidler, Francis & Co.....	33	Co.....	34
Benedict & Burnham Brass & Cop-	—	Klein, Mathias, & Sons.....	34
per Co.....	31	Leslie, A. C., & Co.....	—
Bissell Co., The F.....	35	Lewis Lumber & Mfg. Co.....	33
Burnley Battery Co.....	33	Lindsay Bros. Co.....	32
Butterfield, J. F.....	34	McIntire, C., Co.....	36
Camp, The H. B. Co.....	39	Maltby Lumber Co.....	29
Central Mfg. Co.....	—	Medora Milling Co.....	33
Central Telephone & Electric Co..	—	Michigan Cedar Co.....	33
Century Telephone Const. Co.....	11	Middleton, J. W., & Co.....	34
Chicago, Burlington & Quincy Ry.	—	Miller Anchor Co.....	8
Co.....	—	Monarch Telephone Mfg. Co.....	8
Chicago Insulated Wire Co.....	34	Mullen, Frank.....	33
Chicago Writing Machine Co.....	7	Munk, Otto.....	9
Churchill, E.....	33	Nagel, W. G., Electric Co.....	9
Cohn & Bock.....	33	National Battery Co.....	9
Columbia Mfg. Co.....	33	National Telephone Supply Co..	34
Connecticut Teleph. & Electric Co.	—	National Wire Corporation.....	35
Cook, Frank B.....	2	New Haven Novelty Machine Co..	2
Couch, S. H., Co.....	31	Nungesser Electric Battery Co..	—
Crumb, W. H., Co.....	36	Okonite Company.....	34
Dickey Clay Mfg. Co., W. S.....	36	Pacific Coast Pole Co.....	30
Eastern Telephone Mfg. Co.....	3	Pendleton & Gilkey.....	33
Electric Appliance Co.....	3	Pignolet, L. M.....	32
Elkin Machine Co.....	33	Pittsburg Lake Superior Iron Co.	29
Ericsson Telephone Co.....	9	Prosser & Son, L.....	33
Fahnestock Transmitter Co.....	9	Roebling's, John A., Sons Co.....	32
Fostoria Electric Supply Co.....	12	Sand Point Cedar Co.....	30
Fowler, John H.....	29	Scovill Mfg. Co.....	2
Garton-Daniels Co.....	21	Scribner, A. C.....	30
Gest, G. M.....	38	Spargo, James A., Wire Co.....	34
Hemingray Glass Co.....	—	Standard Underground Cable Co.	—
Holtzer-Cabot Electric Co.....	—	Standard Vitrified Conduit Co..	36
Imperial Finance & Cons. Co.....	34	Stanton, L. W.....	34
Indiana Rubber & Insulated Wire	—	Sterling, W. C., & Son.....	33
Co.....	3	Sterling Electric Co.....	11

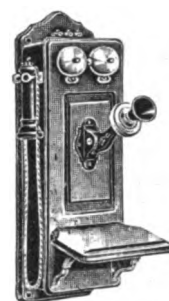
ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Telephone Patent Soliciting a Specialty

New Types

FOR
MAGNETO
AND
COMMON
BATTERY



Neat and compact in
form, symmetrical in de-
sign, perfect in construction
and equipment.

Ericsson Telephones
give a maximum service at
a minimum cost.

Send for Catalog Sheet No. 6



Ericsson Telephone Co.

"INDEPENDENT."

Manufacturers of Switchboards, Telephones and Telephone Supplies
296 Broadway, New York.

STORAGE BATTERIES

UP-TO-DATE **TELEPHONE BATTERIES** MUST HAVE

HIGH CAPACITY

MINIMUM DEPOSIT IN BOTTOM OF CELLS

CONSTANT CURRENT FLOW

EXTREMELY LOW INTERNAL RESISTANCE

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

**Mechanical
Electrical
Stationary**

DRAWING ENGINEERING

**Civil
Sanitary
Textile**

ARCHITECTURE

TELEPHONY

COLLEGE PREPARATORY COURSE

TAUGHT BY MAIL.

Illustrated Bulletin Giving Full Information of 60 Different Courses in Engineering Sent Free on Request.

HUNDREDS of aspiring young and middle-aged men in all walks of life know what the instruction of the American School of Correspondence is. Other hundreds need just such instruction to enable them to get on in life. To bring to the attention of draftsmen, engineers, architects, teachers and others interested in drawing, the standard of our instruction, we have compiled, from the regular instruction papers in our drawing courses, a practical treatise under the title of

Compendium of Drawing

**In
Two Volumes—
900 Pages
1,000 Illustrations**

including full page drawings, sections, diagrams and folding plates.

ONE VOLUME will be sent by Express, prepaid, on receipt of and three monthly payments of \$1.00 each; or BOTH VOLUMES on receipt of \$1.00 and five monthly payments of \$1.00 each.

50¢

Bound in Green Buckram.

Money Refunded if not Satisfactory.

On receipt of this amount (Address Room 9L) and the names of two persons who would be benefited by our courses, the books will be sent express prepaid with the privilege of returning within ten days if not satisfactory and money refunded. The regular examination questions of the School are bound into each volume to test the readers' knowledge. We are offering the books substantially at cost because we know an examination of the work will show at once the practical value of our instruction.

PARTIAL TABLE OF CONTENTS.

PART 1.

MECHANICAL DRAWING, by Prof. E. Kenison, Mass. Inst. of Tech., Boston.
SHADES AND SHADOWS, by Prof. H. W. Gardner, Mass. Inst. of Tech.
PEN AND INK RENDERING, by D. A. Gregg, Mass. Inst. of Tech.
PERSPECTIVE DRAWING, by Prof. W. H. Lawrence, Mass. Inst. of Tech.
ARCHITECTURAL LETTERING, by F. C. Brown, Architect, Boston.

PART 2.

WORKING DRAWINGS, by Prof. W. H. James, Mass. Inst. of Tech., and Prof. C. L. Griffin.
MECHANISM, by Prof. W. H. James, Mass. Inst. of Tech.
MACHINE DESIGN, by Prof. C. L. Griffin, formerly Prof. of Machine Design, Pa. State College.
SHEET METAL PATTERN DRAFTING AND TINSMITING, by Wm. Neubecker, N. Y. Trade School.

A

300

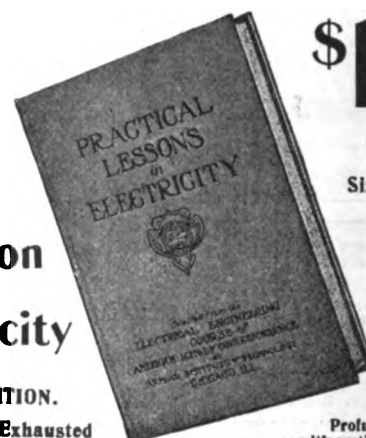
Page

Book on

Electricity

THIRD EDITION.

**Two Editions Exhausted
in Two Months.**



\$1.35
By Express
(prepaid)

Size of Page **7 x 10 in.**

Bound
in
buckram.

Profusely Illustrated
with sections, diagrams,
tables and full-page plates.

To demonstrate the standard, scope and methods of the American School of Correspondence in teaching Electrical Engineering, by mail, we have bound up four representative instruction papers in our Electrical Engineering Course under the title of

Practical Lessons in Electricity

and will send one copy, express prepaid, to every reader of AMERICAN TELEPHONE JOURNAL who sends us \$1.35 and the names of two persons whom he knows to be interested in the subjects we teach, designating the subject. (Address Room 9L.)

The book is invaluable to telephone men, as the chapter on wiring covers fully the requirements of the National Board of Underwriters. Patent attorneys, owners of electric launches and automobiles find it a useful manual for ready reference.

THE AMERICAN TELEPHONE JOURNAL says:

"The section on Storage Batteries, by Prof. Crocker, of Columbia University, strikes us as being particularly good. It gives just the sort of storage battery information and tells it in just the sort of way that will reach the practical telephone man, who should at least have a good idea of this appliance which is now so common in these days of central energy."

Partial List of Subjects Embraced:

STORAGE BATTERIES (by Prof. F. B. Crocker, Columbia University).
ELECTRIC WIRING (by H. C. Cushing, Jr., author of Standard Wiring).
ELECTRIC CURRENT (by L. K. Sager, S. B.).
ELEMENTS OF ELECTRICITY (by L. K. Sager, S. B.).

The book is easily worth \$3.00, and we offer it at the above low price for a limited time, believing that it will be the means of interesting the purchaser further in the work of the American School of Correspondence.



THE TECHNICAL WORLD is a monthly illustrated technical journal devoted to the interests of the technical worker and the practical business man who wants information on the hundred and one problems in engineering which are constantly arising in daily life requiring a knowledge of electricity for lighting, power, electric bell; steam; the scientific heating, ventilation, and plumbing of buildings; architecture; the uses of the telephone and telegraph, etc.

A very valuable department is the MONTHLY REVIEW of the leading articles in the American and English journals. These reviews are written by specialists and take up the latest and best in science and invention.

Subscribers are offered the advantages of professional advice from the staff through the Consulting Department of the Magazine.

SUBSCRIPTION PRICE, \$2.00—20 CENTS A COPY.

**SPECIAL
CLUBBING
OFFER**

\$2.00

One Year's Subscription to **THE TECHNICAL WORLD**
AND
PRACTICAL LESSONS IN ELECTRICITY—Both for **\$2.00**

This Offer Expires June 1st, 1904.

AMERICAN SCHOOL OF CORRESPONDENCE,

3321 Armour Avenue,

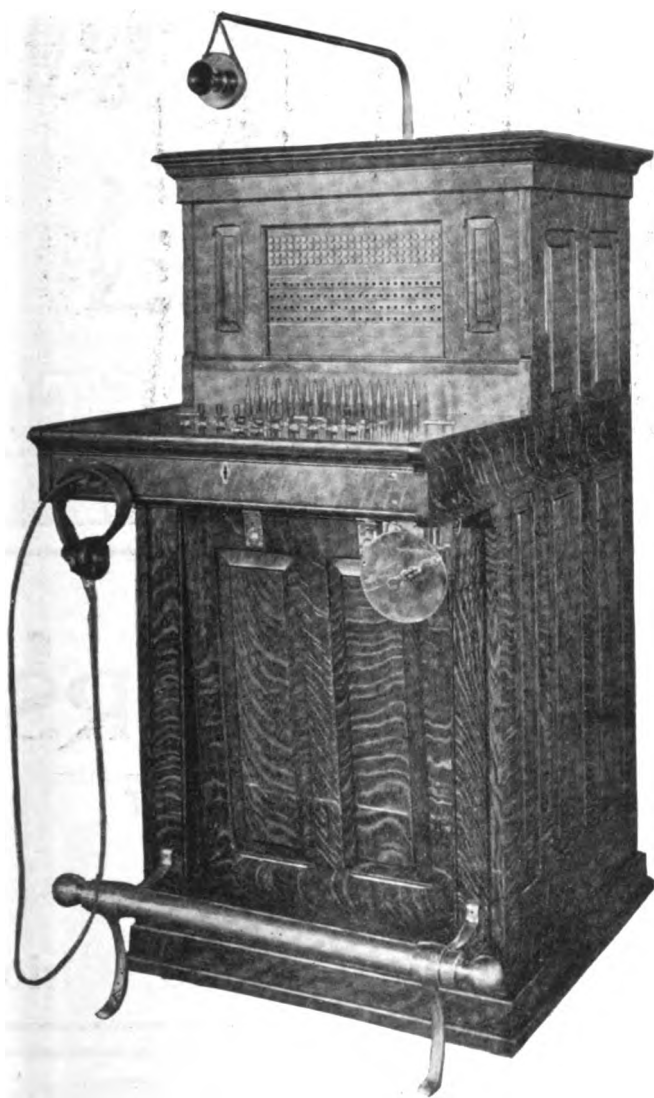
CHICAGO, ILL.

Mention the AMERICAN TELEPHONE JOURNAL

We Do Not Infringe

OTHERS' PATENTS

***Our Equipment Covered
by Our Own Patents***



100 LINE LAMP SIGNAL MAGNETO BOARD.

Common Battery Multiple

Lamp Signal Magneto

Bell Type Tubular Drop

Switchboards for All Services

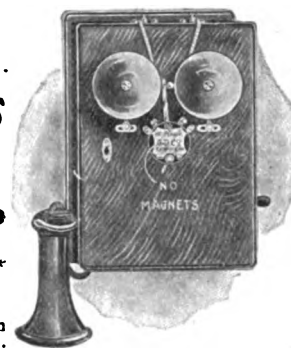
**Sterling Electric Co.
LAFAYETTE, IND.**

No Magnets

You can't burn it
out if you try

The G. D. DROP

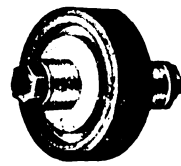
Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple, Durable. Cheap. *Pamphlet Do.*



GARTON-DANIELS CO., Keokuk, Iowa

THE CENTURY "Platinum Electrode" Transmitter

Electrode
Surface
Pure
Platinum



FRONT VIEW

Double
Auxiliary
Mica
Diaphragms

Electrodes
Insulated
From
Transmitter
Body



BACK VIEW

Unequalled
for
Quality
of
Transmission

2 VIEWS OF TRANSMITTER CUP

**ALL CENTURY TELEPHONES
Equipped with this Transmitter.**

**Century Telephone Construction Co.
536 Ellicott Sq., BUFFALO, N. Y.**

TRY A SIGN—

one of our Enameled-Iron-Last-For-Ever kind—on one of your pay-stations. Hang it conspicuously over one that doesn't pay very well. The result will surprise you, and we'll get a large order from you. Write us anyway for information.



***Ingram-Richardson Mfg. Co.
BEAVER FALLS, PA.***

**DEVELOPMENT AND PROGRESS
STAND FORTH CLEARLY IN**

SWEDISH AMERICAN

APPARATUS

WRITE FOR CATALOGUE

SWEDISH AMERICAN TELEPHONE CO.
CHICAGO.

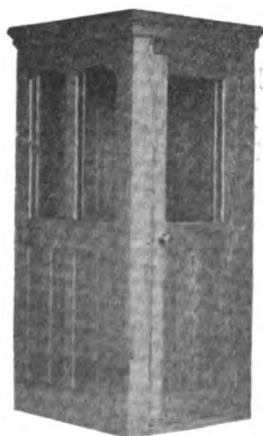


**A REVOLUTION IN
TELEPHONE PROTECTORS**

The Marvel of the Twentieth Century—Just Out

AGENTS WANTED

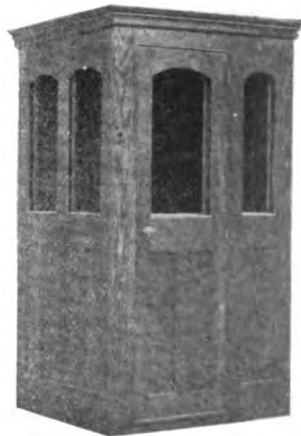
FOSTORIA ELECTRIC SUPPLY CO., Fostoria, Ohio



Exchange managers, all of them, must sooner or later come to the conclusion that it pays to install booths liberally. Why not do it now and begin immediately to reap benefits that by waiting are a present loss.

You know where to get the best, don't you? If not, write.

**YESBERA MANUFACTURING CO.,
TOLEDO, OHIO.**



The American Telephone Journal

Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building Chicago.

VOLUME IX

SATURDAY, APRIL 30, 1904

NUMBER 18

THE TELEPHONE SCOUT

By GEORGE E. FROST.

In modern warfare, as well as in modern commerce, the telephone has grown to be of great importance. An emergency telephone outfit constitutes a part of the signal corps equipment of all modern armies and the officers have learned to rely on the instrument as a means of transmitting orders and dispatches. The prevailing practice now is to establish a temporary telephone exchange at every camp, with a special cordless switchboard and peculiarly designed instruments which connect the headquarters of the commanding officer to those of his subordinates, which may be scattered over an area many square miles in extent. If that portion of the signal corps to which is assigned the function of maintaining telephonic communication, has kept properly up to its duties, a telephone circuit would be strung from the main headquarters as the army advances through the country, which would enable the army corps to keep in touch

indicated, and would gain, as nearly as he could, the intelligence desired by the officer by whose sanction he had been sent out. He then would have to return and make his report and await further directions. If some additional point of information was now desired, occasioned by the scout's report, it would be necessary for him to repeat his hazardous trip to the front. Advices now gleaned might require further modification so that it is possible to conceive of instances where the scout would have to make many excursions before all evidence required would be obtained.

Where telephonic scouting is resorted to, the possibility of repeated trips is avoided. The scout carries his telephone with him, laying his line as he proceeds. When desired, by simply signalling, he can talk to his superior, tell what is seen and receive orders direct, as what to do next. All sallying back and forward is done away with. One excursion



Fig. 1. A Telephone Scout. The Observer Dictates What He Sees to the Telephonist, Who Transmits It Back to the Commanding Officer.

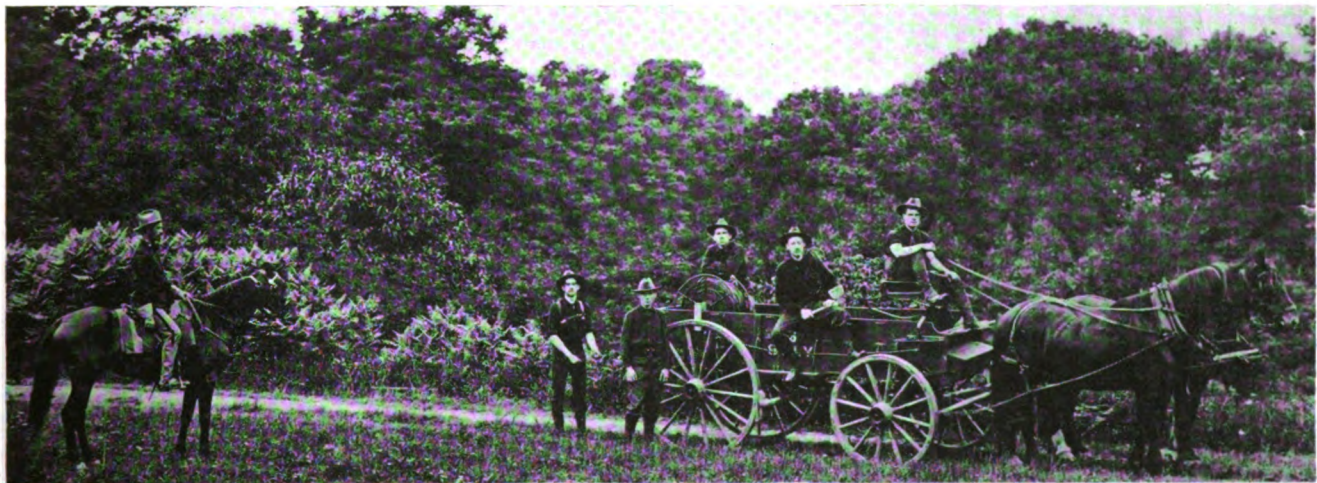


Fig. 2. Telephone Detail Party. The Reel on the Rear of the Wagon Carries a Conductor, Which is Paid Off as the Crew Proceeds.

with the commander-in-chief or the base of supplies. Such, roughly, is the function of the war telephone.

For scouting service the telephone is peculiarly adapted. In the days past, the soldier scout detailed to the duty of obtaining information concerning the whereabouts, strength of or movements of the enemy, would proceed in the direction his orders

suftices. It is considered best to detail two men to such duty, one to do the scouting, to handle the field glass and devote his whole attention to observing, the other to telephone in what the observer directs. The scout frequently is an experienced commissioned officer, an accurate observer, well trained in military matters and who can well appreciate conditions. When

scouting he notes some point that would seem of value to his superior officer at the other end of the telephone circuit. He dictates to the assistant manipulating the telephone instrument (who is a signal corps man—an electrician). If the superior officer desires details, he has to but ask. The signal corps attaché repeats the question to the observer and the answer is transmitted back immediately.

Fig. 1 is from a photograph, showing two men on scout duty. The observer has the field glasses in his hand and the signal corps man has the micro-telephone. On his back are carried the batteries for the instrument and the reel of wire which connects him with his headquarters and reels out as he goes forward. For the connecting medium a single conductor is usually desirable, making a ground return necessary. To make the ground, a sword, bayonet or even a hatchet or axe is thrust into the earth and the wire twisted around an exposed portion of it.

As it is not possible for the scout to carry a great length of

conductor on the reel on his back, a supply is often carried on a reel wagon. When the scouting party starts the reel wagon and crew (Fig. 2) accompanies it until it would be hazardous for the wagon and crew to proceed further. Then the observer and telephonist advance alone on foot, the conductor on the scouting telephone reel having been already connected with that carried by the reel wagon. The apparatus is so arranged that continuous communication from the time the reel wagon starts until the scout is at the farthest advance position, is provided for. The conductor is specially prepared to withstand the hard usage to which it is subject. It is laid at first merely on the ground along the wagon route. If there is a likelihood of the line being at all permanent, a signal corps detail will follow the wagon and support the conductor to trees or lay it in protected places where it is not so apt to be harmed. Such an equipment as the one described is used by the Japanese troops in the present war.

IMPEDANCE AND RETARDATION—ARTICLE V.

BY ARTHUR VAUGHAN ABBOTT.

IN order to deal with capacity we must have a unit with which to measure it. It has been shown that a unit circuit is one which contains a unit of resistance. If to such circuit the poles of a generator giving a unit of electromotive force be attached a unit of electricity will pass in a unit of time. That is to say, if a generator having an electromotive force of 1 volt be attached to a circuit having a resistance of 1 ohm a current of 1 ampere will flow through the circuit. In 1 second of time a certain quantity of electricity will evidently be delivered. This is the unit of *electrical quantity*, and is called the *Coulomb*. Now the unit of capacity is such a capacity as will hold one coulomb of electricity when there is a pressure of one volt applied to its terminals. This theoretical unit is called the *Farad*, but is a capacity so enormous as to be utterly beyond practical electrical operations, for it is a greater capacity than that possessed by the entire solar system, so for convenience' sake, the practical unit of capacity is the *micro farad*, or one millionth of a farad, and most telephonists have a pretty good idea of the meaning of this term, for the ordinary sub-station condenser is usually from two to three micro farads.

Suppose we attach an ordinary sub-station condenser to the poles of a continuous current dynamo machine or battery, and interpose an ammeter in the circuit (Fig. 7), we shall find that the needle of the ammeter does not deflect, except at the instant of opening and closing the circuits, a result which would be expected because the conductors (the sheets) of tin foil are separated by paraffine paper, an insulator. If we arrange the circuit so that it can be suddenly closed by a key, while one watches the needle of the ammeter it will be noticed that the needle gives a jerk, showing that at the instant the key is closed electricity *does* pass to the condenser. If the circuit be so arranged that when the conductor is disconnected its poles can be short circuited, the ammeter will give another kick in the opposite direction, showing that the electricity stored by the condenser has been discharged by the short circuit.

If we substitute for the continuous current an alternating current a very different state of affairs is found, for with the alternator the ammeter will show a current constantly passing through the circuit notwithstanding the presence of the condenser. We have seen that inductance behaved to oppose and retard the amount of electricity passing in an alternating current, and makes it smaller than that which flows in the same circuit from a continuous current. The preceding illustration indicates that the addition of capacity to an alternating current circuit tends to increase the current, and thus capacity may be said to be the opposite of inductance.

Consider now an alternating current circuit in which there is a condenser, and for this purpose refer to Fig. 8, in which the curve *E F H* represents the electromotive force of an alternating current generator. Let us suppose the circuit to be closed at the instant when the electromotive force is at its lowest point *E*, and is just beginning to rise on its upward journey towards *F*, the condenser, like an empty rubber bag, begins to drink in with avidity the current, and as the electromotive force rises the current flowing into the condenser will be represented by *O C D*. As the electromotive force proceeds towards the maximum at *F* the condenser becomes more and more fully charged, and consequently the current slowly decreases, until when the electromotive

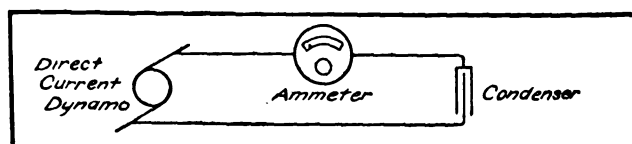


Fig. 7. Condenser in a Dynamo Circuit.

force reaches its highest point, *F*, the condenser can hold no more electricity and the current for a fraction of an instant stops. Then the electromotive force begins to decline towards *H*, and under these circumstances the elasticity of the condenser, like the rubber bag, forces it to discharge, and the current flows backwards into the circuit, as is indicated by the curve *D*. Thus with every alternation the condenser alternately absorbs and discharges electricity. In this respect it exactly resembles inductance, for while it takes up electricity during one-half of every wave it does not to any appreciable extent waste energy as resistance does in heat, which cannot be recovered.

It has been shown that inductance causes the current to lag *behind* the electromotive force and to reach its true value later in time than if the inductance had been absent. Fig. 7 shows that capacity causes the current to advance ahead of the electromotive force. To use a homely analogy, it may be said that the condenser sucks up the electricity and pulls it forward faster than it would otherwise travel. This inductance and capacity are seen to be exactly the opposite of each other, and the thought at once occurs that a circuit could be so proportioned by adding either inductance or capacity, so that one might neutralize the effect of the other.

In considering inductance it has been shown that the frequency of the alternating current played an important part, and that in calculating reactance it was necessary to introduce the speed as a factor. Precisely the same method of reasoning must be applied to capacity—that is, capacity reacts upon a circuit just as inductance does, only it effects the circuit in the opposite manner, so

that in calculating the effect of inductance or capacity it is necessary to introduce the alternating speed of the current. The effect due to inductance was shown to be:

$$\text{Reactance due to inductance} = 2 \pi N L$$

Now, if we represent the capacity of a condenser in micro-farads by C , remembering that the operation of capacity is opposite to that of inductance, we may write for the effect which a condenser produces upon an alternating circuit

$$\text{Reactance due to capacity} = \frac{1}{2 \pi N C}$$

For example: Suppose a 50 micro-farad condenser be inserted directly across an alternating current circuit of 100 frequency, what is the effect? The capacity of 50 micro farads can be written .000050 farads, then

$$\text{Reactance due to capacity} = \frac{1}{2 \pi N C} = \frac{1}{2 \times 3.14 \times 100 \times .000050}$$

= 31.8 ohms.

Such a circuit would behave exactly as if it had a resistance of

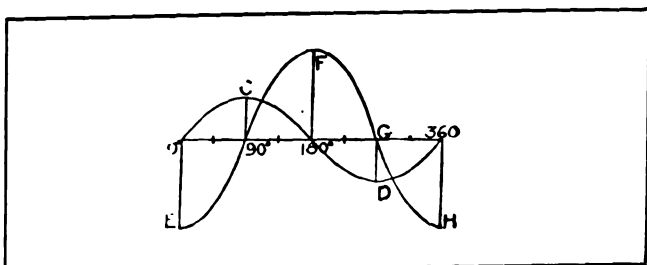


Fig. 8. Curve Showing Leading Current Due to Capacity.

31.8 ohms, and with an e.m.f. of 100 volts 3.14 amperes would flow in the conductors connecting the condenser. In this example it has been assumed that the circuit contained no resistance, but no such theoretical circuit ever exists. It is, however, easy to calculate the impedance of a circuit which contains both capacity and resistance in exactly the same manner as has been described for obtaining the impedance of a circuit, containing inductance and resistance.

Example: Suppose a circuit to have 35 ohms resistance (the same amount used in the preceding example for calculating the impedance of a circuit containing resistance and inductance) and a capacity of 50 micro farads. On a sheet of section paper take the point A , Fig. 9. Lay off AB equal to 35 ohms. At the point B draw the line BC vertically downwards and make it equal to 31.8 ohms. The line BC represents the reactance due to capacity, and is drawn downwards because in the preceding example the line BC , representing the reactance due to inductance, was drawn upwards, and as it has been shown that the reactance due to capacity is opposite, opposed to, and will neutralize the reactance due to inductance, these lines must be drawn in opposite directions. If now the line AC be drawn it will represent the impedance of a circuit containing 35 ohms resistance and 50 micro farads. By scaling Fig. 9 it is found that the line AC is 48.3 ohms. With 100 volts electromotive force such a circuit would carry 2.13 amperes. If, therefore, we represent by I_c the reactance due to a circuit containing resistance and capacity and substitute this quantity for R in Ohm's formula, we shall still find his law to hold true, namely

$$I_c = \frac{E}{C}$$

The arithmetical method may be adopted to solve problems of circuits containing capacity in the same manner as those having inductance. That is to say, the impedance.

$$I_c = \sqrt{R^2 + \left(\frac{1}{2 \pi N C} \right)^2}$$

In a circuit containing inductance it was shown that the current lags behind the e.m.f. and that the angular displacement could be found by dividing the reactance due to inductance by the resistance. In a circuit containing capacity the current is in advance of

the electromotive force, and the angular distance between them can be found in exactly the same manner—that is to say, by dividing reactance due to capacity by the resistance. Or in other words,

$$\text{The tangent of the angle of lead} = \frac{1}{N C} = \frac{R}{2 \pi N C}$$

Having solved this equation for any particular case, thus obtaining the tangent angle of lead, the angle itself may be found by referring to Table 2.

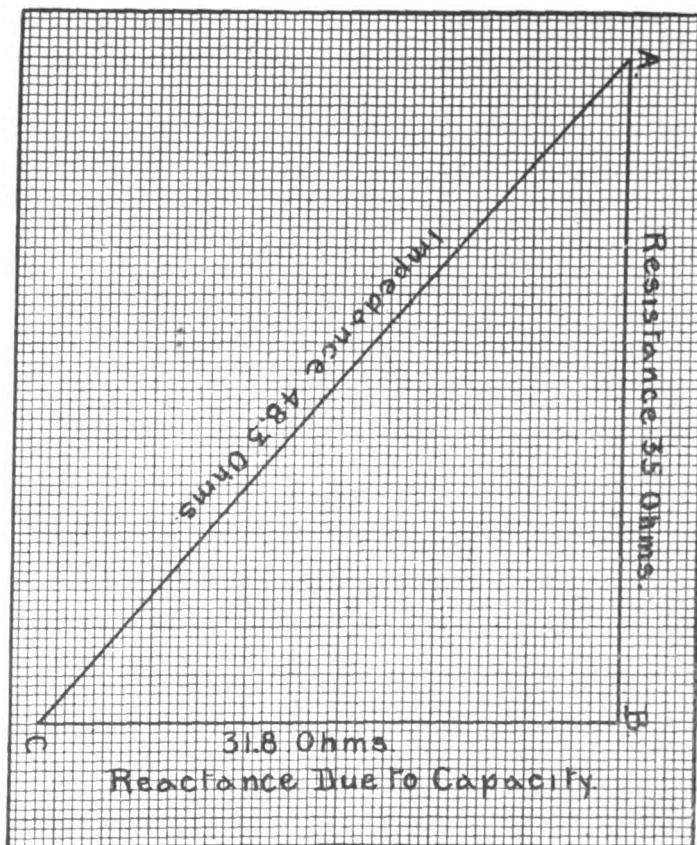


Fig. 9. Calculation of Impedance Due to Capacity.

We have so far only attempted to calculate the impedance of a circuit which contained either resistance and inductance, or resistance and capacity. But practically every circuit contains all three. By combining the methods given the impedance of any circuit can be found. To illustrate, take the quantities of the preceding example, in which

$$L = .025 \text{ henrys}$$

$$C = .000050 \text{ m.f.}$$

$$R = 35 \text{ ohms}$$

$$N = 100 \text{ alterations per second.}$$

$$2 \pi = 6.28$$

Required the total impedance of the circuit and assuming the generator to have an electromotive force of 1,000 volts to calculate the current. It has previously been shown that the reactance due to capacity was 31.8 ohms.

FIRST SOLUTION—GEOMETRIC METHOD: On a sheet of section paper take any point A and draw AC horizontally and make AC equal on any convenient scale to R . In Fig 10 the scale is 10 ohms per inch. From A lay off the line AB vertically upwards, and make it equal on the same scale to the reactance due to inductance, 15.7 ohms. It has been shown that the reactance due to capacity was 31.8 ohms. Now from the point B lay off BD vertically downwards and make it to the same scale equal to the reactance due to capacity, 31.8 ohms. Evidently by this operation we have subtracted the reactance due to capacity from that due to inductance, for $AD - BD = AB$, and so the line AD is equal to the algebraic sum of the two kinds of reactance considered as opposing each other.

From the point *C* draw the line *DC*. This line is then the impedance of the circuit containing the above specified properties, and from the diagram is found to be equal to 38.6 ohms.

SECOND SOLUTION—ALGEBRAIC METHOD: It has been shown that the reactance due to inductance is

$$2 \pi N L$$

and that the reactance due to capacity is

$$\frac{I}{2 \pi N C}$$

and that capacity acts oppositely to inductance, hence the sum of

TABLE NO. 2.	
VALUES OF NATURAL TANGENTS FOR EVERY FIFTH DEGREE.	
Degrees.	Tangent.
0	.000
5	.0874
10	.1763
15	.2679
20	.3639
25	.4663
30	.5773
35	.7002
40	.8390
45	1.000
50	1.191
55	1.428
60	1.732
65	2.144
70	2.747
75	3.732
80	5.671
85	11.430

the reactance in any circuit will be

$$2 \pi N L - \frac{I}{2 \pi N C}$$

and it has also been shown that the impedance of any circuit is equal to the square root of the square of the resistance plus the square of the reactance, hence

$$\text{Impedance} = \sqrt{R^2 + \left(2 \pi N L - \frac{I}{2 \pi N C}\right)^2}$$

In this case

Impedance = $\sqrt{35^2 + (31.8 - 15.7)^2} = 38.6$ ohms,
and if the generator develops 1000 volts the current will be

$$C = \frac{E}{I} : C = \frac{1000}{38.6} = 27.4 \text{ amperes}$$

In a circuit containing both kinds of reactance the current will either be in advance of or will lag behind, the electromotive force, depending upon whether the reactance due to capacity or the reactance due to inductance is the greater. To determine the angle between the current and the electromotive force we have the expression

$$\text{angle of lag} = \frac{2 \pi N L - \frac{I}{2 \pi N C}}{R}$$

solving this expression the tangent is found, and by referring to Table 2 the angle is known. If the value found for the tangent is a positive quantity, the current is in advance of the electromotive force, while if it is negative it is behind.

We have now seen that in an alternating circuit we must deal with four factors in order to find the quantity of current which traverses such a circuit. The *ohmic resistance*, the *inductance*, the *capacity* and the *speed* at which the current is alternating. A variation in any one, or any combination of these factors will alter the ability of the circuit to transmit electricity.

In telephonic language Impedance and Retardation mean about

the same thing, and are employed to denote the opposition which any circuit offers to the passage of electricity. There are few, even of the deep voices that in normal speaking give forth vibrations of less than about 100 per second, and equally few high tones that rise above 2,000. So the range of alternations in telephonic circuits begins at about the point where lighting circuits leave off, and continues upward to something like twenty times the speed that is customary in other electrical industries. As the alternating speed in telephonic circuits is much greater than is otherwise met with, reactance, whether due to capacity or inductance, becomes more serious. All circuits designed to transmit conversation should be as far as possible freed from all forms of reactance, and should be made as straight and as direct as possible without coils, and should not be placed in proximity to magnetic material. On the other hand, it is perfectly feasible to insert any number of bridges or shunts in a talking circuit, provided they are made of very high impedance, due to *inductance*, by winding them with fine coiled wire and surrounding them with the best magnetic materials.

In case reactance, due either to inductance or capacity, exists, it is possible to neutralize the evil effects that would otherwise accrue by inserting in the circuit the proper amount of the other kind of reactance to balance. This principle lies at the basis of the invention of Dr. Pupin to improve telephonic transmission by counterbalancing the superabundance of reactance due to capacity which exists in all open wire lines and cables, by the addition of reactance due to inductance, which is accomplished by placing at frequent intervals along the line small impedance coils. Formerly telephonists were horrorstruck at a proposition to place impedance coils in a long toll line, but from what has preceded it will be perceived to be a perfectly legitimate method, and the essence of Dr. Pupin's invention lay in his ability to calculate exactly the amount of inductance which is needed under various circumstances, and precisely where it should be placed in order to produce the best results. From this illustration the value of

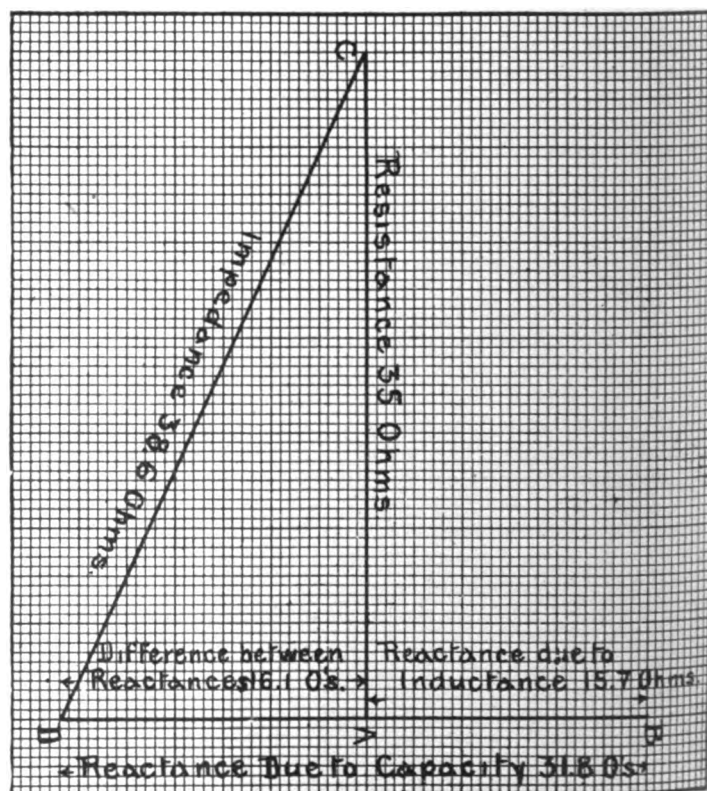


Fig. 10. Calculation of Impedance in Circuit Containing Resistance, Induction and Capacity.

being able to calculate and measure the impedance, which is due to any form of reactance, will be readily perceived, and in the succeeding papers the methods of accomplishing this will be taken up.

HOW TO MAKE A SENSITIVE GALVANOMETER

A SENSITIVE and well-made galvanometer may be used for a variety of purposes. Not only may it be used for the testing of resistances, both high and low, but by the use of a proper shunt may be used to measure strong currents, and by the use of a high series resistance may be used to measure the voltage of an electric circuit. An old telephone generator furnishes excellent magnets for the construction of such a galvanometer. A magnet which a writer in *Popular Mechanics* secured from such a source measures 6 inches in length and is made of steel, which is $\frac{1}{2}$ inch by $\frac{5}{8}$ inch. The more powerful the magnet the better. Its dimensions may vary somewhat from the one used in the following paper, but the reader can easily modify his instrument to suit his needs.

A bottomless box with a glass top will be required, mounted upon a base board, the whole being suited to be screwed to the wall, as shown in Fig. 1. This box is 7 inches by 13 inches outside measurement, and $4\frac{1}{2}$ inches deep. The base board should be $15\frac{1}{2}$ inches by $8\frac{1}{2}$ inches. The box is secured to the base board by two hasps, one on each side, two or three dowel pins helping to hold the box from slipping. This method of securing the box is adopted so that the case may be easily removed, giving access to the working parts of the instrument inside.

The magnet used being $\frac{5}{8}$ inch wide, two pieces of iron, shown at P, are made for pole pieces. These are $\frac{5}{8}$ inch square and $1\frac{7}{8}$ inches long, and have bored through them two holes $\frac{1}{8}$ inch in diameter, through which are to pass screws to secure them in place. Secure the magnet firmly to the base board, its poles being $9\frac{1}{4}$ inches from the bottom, and at equal distances each side of the center line. A block of wood at each side of the magnet, another at the bottom, and two clamps, one at each side, ought to secure the magnet firmly in place so that it cannot slip. Then screw the pole pieces into place, taking care that they rest firmly against the inner poles of the magnet. This will leave 1-7-16 inch of clear space between the poles, if the dimensions given have been followed. If the magnet used has dimensions differing from those given at M, Fig. 2, allowance will have to be made in the pole pieces, so as to leave the proper space between the pole pieces.

In the exact center of this space is to be secured an iron cylinder, shown in Fig. 1, and also at C in Fig. 2. This is $1\frac{7}{8}$ inches long and $\frac{3}{4}$ inch in diameter. It is to be fastened to the base board by a screw passing completely through it. This should leave a clear space of 1-32 inch on each side of the cylinder. It is well at

this point to take a very small, sharp chisel and cut two grooves in the base board, these grooves being extensions backward of the spaces between the poles and the cylinder on each side. These grooves are necessary in order to allow the coil shown in Fig. 1 to swing freely in either direction without striking the back board.

Take next a piece of the thinnest copper procurable. It should

be very thin in order to be light and to take up as little space as possible. From this sheet copper make a frame such as is shown at F, Fig. 2. It is rectangular in shape and measures 2 inches by $\frac{7}{8}$ inch inside, and $2\frac{1}{2}$ inches by $1\frac{3}{8}$ inches outside. Its width is $\frac{1}{4}$ inch. As shown in the side view at K, it is a frame with the edges bent up so as to form a deep groove running around the face of the frame for holding a coil of fine wire. Where the frame overlaps it must be neatly soldered. At the corners the turned-up edges will be cut away, but this will do no harm. Line the slot in this frame with a layer of thin but tough paper, fastened in place by shellac. This serves to insulate the frame. Then wind the slot full of No. 36 single silk covered magnet wire.

The ends of this coil are left projecting, one at each end. Shellac the outer surface of the coil and set it aside to dry. Now make two little pieces shown at E, Fig. 2. They are made by taking a piece of thin copper, $\frac{1}{4}$ inch by $\frac{3}{8}$ inch, and soldering to its center a projecting wire of stiff brass, $\frac{1}{4}$ inch long. Flatten the outer end of the brass wire and drill a small hole through the flattened part. These little pieces are then bound on to the ends of the coil by silk threads, so that the projecting wires form a spindle about which the coil may rotate. For this reason they must be so adjusted as to project from the exact center of each end. Also care must

be taken, in bending them on, to insulate them from the coils by slipping a piece of thin paper under them. Then the projecting ends of the coil are soldered to these little strips, one at each end, and the superfluous wire cut off.

Two pieces of brass should be made like those shown at B, and also at H, Fig. 2. As shown in Fig. 1, there are to support the coil in position. The hole through B, therefore, should be $\frac{3}{8}$ inch from the back side of the piece, and H should slide freely through B, but may be secured by a set screw. One of the pieces shown at H should be threaded and provided with a thumb nut as shown at T, Fig. 1. One end of H should be flattened and drilled, as were the ends of the projecting wires on the coil. Now procure some fine silk fibers, preferably of raw silk, and pass one end of

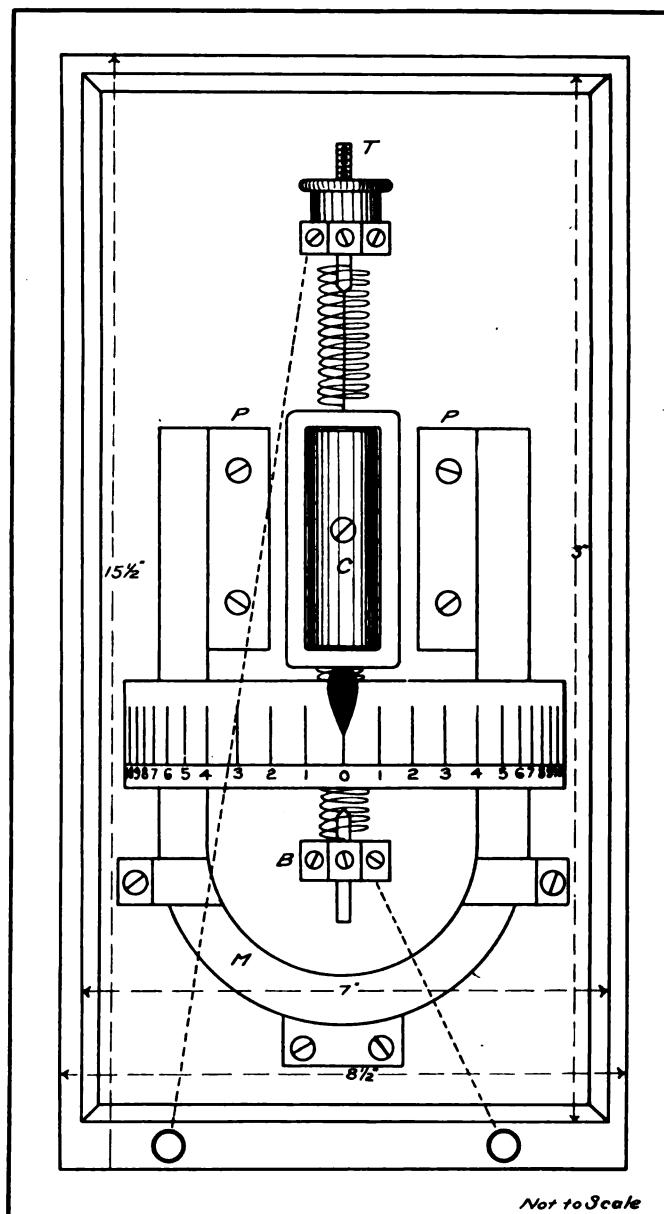


Fig. 1. The Assembled Galvanometer.

new subscribers are secured they may be assigned the most convenient places, both in the cable plant and in the switchboard.

Fig. 3 illustrates a desirable record of the line plant. The card is 3 by 5 inches. This record shows all of the circuits of the

LINE RECORD			
NO.	ST.		
SUB	TEL NO		
ROUTE OF LINE			
CABLE	CON.	TER	PR

Fig. 3. Line Plant Record.

exchange and is arranged by streets. When the wire chief receives an order to install a new telephone he can, from the address, at once refer to the line record and ascertain what available circuits there are for the parties. Such a record should also embrace full information in regard to all party lines, so that each circuit may be filled with its complement of parties as rapidly as possible.

The line cards should show the route of each circuit together with each cable terminal box it is connected to, also the subscriber's

SIZE	LENGTH	LOCATION OF TERM.	
IN PRS.			CABLE RECORD
400 PR			
300 -			
200 -			
100 -			
50 -			CABLE NO
25 -			
10 -			
5 -			CAPACITY PR.
NO. OF TERMINAL			
TER. CAPACITY			
TER. DISTRIBUTION			
RESISTANCE PAIR	CLASS	TEL NO.	CONDITION REMARKS

Fig. 4. Loose Leaf Cable Record.

name and telephone number. It is advisable to keep this record both under alphabetical and street headings, and also under cable or toll line numbers. Whenever a line becomes dead the cards should be filed in a similar dead compartment to that used for

subscribers. The information comprised in the cable record should specify definitely the circuits of each cable, together with all of its connecting terminals and distributing boxes. It should also show the length and location of each cable run. A convenient form for the cable record, which should be of the loose leaf design, is shown in Fig. 4. This may be easily expanded or abridged to fit the necessities of any particular plant.

The construction and maintenance force should give a daily

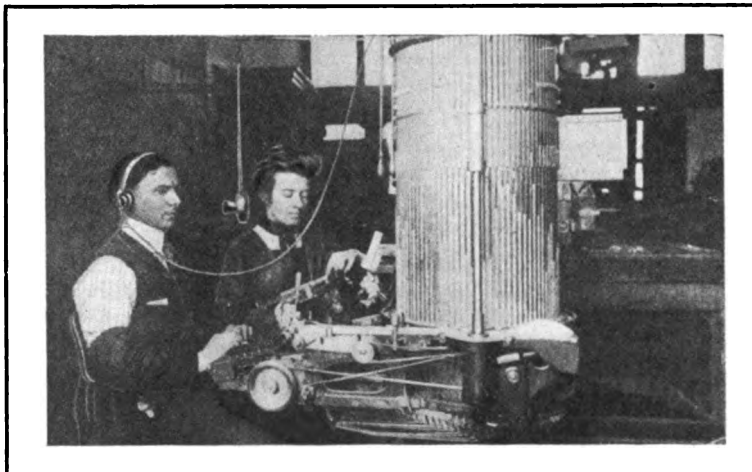
WIRE CHIEF'S DAILY REPORT			
EXCHANGE		DATE	
TROUBLEMEN	HRS.	EX.	
TROUBLE			
CLASSIFICATION	REPT.	CLEAR	CARRIED
CABLE			
LINE			
INSTRUMENT			
SWITCHBOARD			
TOTAL			
NEW INSTALLATIONS			
REMOVALS			
REMARKS			
SIGNED		WIRE CHIEF	

Fig. 5. Wire Chief's Daily Record.

report of all work done on any portion of the line plant, and this the wire chief should enter in the proper place in the wire chief's daily record. The form for this purpose is illustrated in Fig. 5. and shows a suggested method of classification that has proved of value in keeping track of trouble. No cast iron form avails for every telephone system, so that the suggestions here made must be considered merely as tentative and to be modified to fit any particular case as experience may indicate.

RECEIVING COPY BY TELEPHONE

MANY devices are resorted to in modern newspaper offices in order to get the latest news into the publication. A method adopted by the *Daily Press*, of Ashland, Wisconsin, is shown in the accompanying picture. The type-setting machine operator has a telephone receiver fastened to his ear and a reporter at a football game is dictating the "story" to him. As the reporter says the words the operator immediately sets them into the type. By means of this contrivance it is possible to have the newspaper on the street, containing a full description of the game, a few minutes after it is finished. Last fall there was considerable rivalry between the Minneapolis, Minn., newspapers to secure a prompt report of the Minnesota-Michigan football game. One paper arranged to receive the description by telegraph and another tried the innovation of transmitting the report telephonically. Both papers, of course, had



their reporters at the game. The men detailed by the paper that used the telegraph would write the description and, as fast as possible, they would send it in installments to the local telegraph office. The telephone newspaper had leased a private circuit from the grounds where the game was played, in Ann Arbor, to its office in Minneapolis. As soon as a play was made the telephone reporter in his booth, which was so arranged that he could have an unobstructed view of the field, would immediately dictate a description of it to his newspaper. The message was posted immediately on the newspaper's bulletin board in Minneapolis, and the matter was also put in type as fast as received. By the time the crowd had finished cheering at the finish of the game the whole outline of it was posted on the Minneapolis bulletin board and a description of it was in type in the stereotyping room and being rushed through to the presses.



AN AMERICAN TELEPHONE AND TELEGRAPH CIRCULAR.

AN investment circular recently issued by Jackson & Curtis, bankers, 15 Congress street, Boston, has a peculiar look when considered in conjunction with the \$20,000,000 loan just negotiated by the American Telephone & Telegraph Company. As has been explained in THE AMERICAN TELEPHONE JOURNAL, the company already bonded heavily and unable to float any further issue of stock, for the first time in its history was forced to apply to the bankers for a straight loan. This enormous sum of \$20,000,000 we have been told by no less an authority than the interesting Boston News Bureau is to be used in the middle west where the Independents have obtained "some foothold," in order to check the spread of this movement. In reality it will be used in subsidizing the press and more especially in rebuilding certain systems that have been allowed to deteriorate until they can no longer be considered in the same class as the comparatively recently constructed and up-to-date Independent lines.

These facts should be borne in mind in order to properly interpret Jackson & Curtis' somewhat remarkable circular. This interesting financial document, under the caption "American Telephone & Telegraph Company," sets forth the greatness of the Bell telephone securities as an investment. A certain western philosopher used to declare that "the truth should not be spoken at all times even in jest." He would find a willing disciple in the firm mentioned. It is difficult to interpret the circular in any other way than a deliberate attempt to deceive the Bell stockholders, actual and prospective, as to the real condition of affairs.

"Everybody, when he puts in a telephone," says this interesting document, "wishes one that can be connected with the greatest number of people; and therefore serious and general opposition to a company so well fortified as this, is very difficult if not impossible." To those who are aware of the fact that the number of patrons of Independent telephones already greatly outnumber the Bell subscribers the naive statement is decidedly amusing.

Still the circular is not entirely without foundation, in fact, the existence of Independent telephony is acknowledged and that is something. "There have been in all parts of the country," says the circular, "Independent telephone companies which have competed with the American Telephone & Telegraph Company." Think of that. Then, as if alarmed at such a large influx of the truth: "Many of them have failed and gone out of existence. Some of them often with loss to their shareholders, have been bought by the American Telephone & Telegraph Company and none of them have ever been able to earn dividends for a series of years."

This is really refreshing and, perhaps, the surprising part is that a tool of the Bell octopus should be willing to admit, even with ample reservations, that there is such a thing in existence as

REASONS WHY THEY NEED THE \$20,000,000.

an Independent telephone movement. THE AMERICAN TELEPHONE JOURNAL explained at some length, in a recent issue, how certain so-called Independent telephone companies have been bought

up by the Bell company. The Independent telephone company is no pet of fate and is amenable to the various commercial laws that govern any business proposition, just as is the Bell company in the long run. There is this difference, however, the Bell company had things its own way so long and had such unlimited capital and opportunities at the start, that a long time elapsed before wasteful and extravagant methods and a total disregard of the rights and convenience of the people began to seriously affect the financial standing of the concern. Independent operators have been obliged to conduct the affairs of their companies along conservative lines and according to strict business principles.

Statistics show conclusively that measured in dollars and cents, the failures of Independent companies have been far less than a thousandth part of the Bell failures. The failure of the Michigan Telephone Company alone, which wiped out millions of dollars in holdings, makes worse than futile any possible rivalry in this direction on the part of Independents. In all probability an occasional Independent company has died of premature birth or neglect, or has been deliberately wrecked by some traitorous management for the glory of the Bell monopoly. But there seem to be a few left. As a matter of fact, a single Independent manufacturer shipped during the month of March 24,000 telephones. This looks very much as if there was "something doing" in the direction of Independent telephony. We can hardly expect Jackson & Curtis to incorporate this fact in their circular, but, nevertheless, it is an interesting bit of truth and highly significant. It is hardly reasonable to suppose that any sane manufacturer would ship 24,000 telephones a month to Independent companies which are tottering on the verge of failure.

A diligent reading of the circular fails to disclose any reference to the fact that the Central Union (Bell) Telephone Company, which covers the great States of Illinois, Indiana and Ohio, has not paid a dividend in over six years. Some of these alleged defunct Independents failed to pay a dividend for a series of years, according to the circular, but that is a different matter. The Central Union Company's territory will absorb the great part of this \$20,000,000 loan and the less said about its dividend earning capacity, the better.

The circular is evidently for distribution in Massachusetts and the New England States and may succeed in bolstering up waning confidence in the virtue of Bell securities. But the time is coming when there will be a great revelation. The sun of Independent telephony, reversing the order of nature, has arisen in the middle west. Already it is shedding its rays over the greater part of the country. People on the Pacific coast see the light. Who knows? Perhaps it may yet penetrate the intellectual and commercial fastnesses of Boston.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

RIGHTS OF COMPANIES IN VILLAGE STREETS.

OUR friend, the Bell Company, has arrived in town. Our people feel they do not need it or any more of its poles. We are incorporated under the general village law, and the records of the village indicate that no franchise was ever granted the Bell Company to set poles. Many years ago they came in to build some lines and have maintained a small exchange since.

Now is there any law permitting its setting poles to extend these lines without permission of either village board or property owner? Where a permission has been granted by a village, have they then the right to set poles without consent of the property owner? In rebuilding a line, will law protect the property owner in compelling the setting of a pole at a designated point? Any other information on the subject will be appreciated.

BY the act under which the telephone company is incorporated, it may construct its lines upon the public roads, streets, or highways of the State of New York, provided the same shall not be so constructed as to incommode the public use of the road or highways. This would entitle the village authorities to regulate the manner of use by the company but would not authorize them to refuse such use entirely. The use of village streets for telephone poles has been held to be within the contemplated purpose for which the streets are constructed. If a telephone system is built in accordance with such regulations as may be reasonable, prescribed by the village board, the abutting property owner's consent is not necessary. The property owner could not designate the points at which poles should be set, but the village authorities might do so.

THE TELEPHONE AS A GAMBLING ACCESSORY.

THE telephone is suffering from the use made of it in connection with race track gambling. In Chicago an injunction suit to enjoin the Chicago Telephone Company from abetting gambling by giving service to the bookmakers was the most drastic of three remedies suggested to Mayor Harrison in an opinion from Corporation Counsel Tolman on the best methods of stamping out the "clearing-houses" of the race track gamblers. The recommendations brought immediate results, and while the law department was waiting for word to begin the suit, a message from the manager of the telephone company announced that he would tear out any instruments which the police found used for gambling purposes. Along the same line is the bill introduced into the New York Assembly, making it a misdemeanor for any telegraph or telephone company to furnish the entries, odds, results or other details of a race.

DISTANCE BETWEEN ADJACENT WIRES.

A RECENT decision of the Supreme Court of Iowa confirms the rule that a reasonable distance must be kept between adjacent lines of telephone wire, and in effect prescribes what such distance shall be. The Northern Telephone Company operates a telephone system in Pocahontas and adjoining counties. The Iowa Telephone Company also maintains a line in the northern part of the State. The Northern Company had in operation a line at Alta, Buena Vista County, and in the vicinity. The Iowa Company subsequently built at the same place. Alleging that the Iowa Company was building in such close proximity to the Northern Company's lines as to seriously interfere therewith, the latter secured an injunction restraining such interference. The defense was that there would be no interference. The trial court found and decreed that defendant's poles should be so placed that a distance of at least ten inches should at all times be preserved between the nearest wires stretched upon the cross-arms attached to defendant's and plaintiff's poles respectively. This was as to

the wires in the highway near the town. In respect of the lines in the town of Alta it was found and decreed that defendant's poles should be so set and located as that a distance of four feet should be preserved between the wires placed thereon, and the wires stretched upon the poles of plaintiff.

Said the court: "Now, neither company—appellant nor appellee—has the exclusive right to the highway or the streets. Neither has the exclusive right to a particular side of a street or highway. Undoubtedly the appellee, being first in possession, is entitled to be protected from unreasonable interference." The decree of the lower court was accordingly sustained. *Northern Telephone Company v. Iowa Telephone Company*, 98 N. W. 113.

INJUNCTION AGAINST WIRE STRINGING IN TENNESSEE.

THE American Telephone and Telegraph Company, at Chattanooga, Tenn., is made defendant in two more proceedings in chancery court, instituted by parties who take exceptions to its methods of securing a right of way between Chattanooga and Cincinnati. William P. Gann and W. H. Roberts, adjoining neighbors, have filed bills alleging practically the same state of facts, and asking for the same relief. They state that the defendant is a New York corporation, duly registered in this State, and that it is building a line between Chattanooga and Cincinnati. Its route carries it past the farms of the complainants. In June, 1903, Earl Jackson, agent for the company, secured from them an easement along the county road, but outside their land. This, they say, was expressly stipulated and the consideration was \$1. But Roberts avers that a second reading of the contract revealed the fact that the right to set poles on his land was conveyed, and he had that stricken out. In spite of this, they say that poles and guy poles with wires have been put on the premises of both, greatly to their damage. They ask that the defendant be enjoined from stringing more wires or turning on an electric current, and that it be compelled to remove the poles and reimburse the complainants for the damage done. Roberts fixes his damages at \$500.

MISSOURI INTERCHANGE CALL BILL.

TO compel telephone companies to interchange calls so that people will not have to use the instruments of two companies at additional cost is the object of a bill introduced in the assembly of Missouri. The bill provides that it shall be the duty of every company upon the request of rival company and upon the delivery of a bond by the requesting company to allow a switch connection so that a subscriber of one company may talk with the subscriber of another without extra charge. In case any company refuses such permission a writ of mandamus may issue, and in case the bond required by the rival company is deemed excessive the writ may also fix the bond.

LICENSES FOR PAY STATIONS.

SUPPOSEDLY at the instance of the Home Telephone & Telegraph Company, warrants have been sworn out, charging the Cumberland Telephone & Telegraph Company with operating pay station telephones in drug stores at Louisville, Ky., without a license. The warrants read:

"Keeping a pay station for telephone service in the city of Louisville without having paid a license therefor, and for receiving and sending telephone messages from said unlicensed pay stations to other points in the city of Louisville on April 5, 1904, and making charges therefor."



IN THE OPERATING FIELD.

A CUMBERLAND EVANSVILLE SUBTERFUGE.

ONE of the best planned subterfuges ever attempted by the Cumberland-Bell Company to secure possession of the right to maintain a telephone system in a town, without holding a franchise authorizing it to do so, has come to light in Evansville. Since the decision against the municipal company, on March 27, in which the Independent company was enjoined from using its franchise, on the grounds of technical mistakes in its articles of association, the Bell company has renewed the fight to gain possession of the field. It realizes that the temporary injunction granted the city, in its suit to oust them, is soon to be made permanent and it knows that if it is to keep the police from cutting down the poles that it will have to act at once. That the Cumberland company is not over nice in the choice of methods to be employed, the following shows:

On April 22, Attorney Granberry, for the Bell, accompanied by the local attorney for the Bell, Mr. Walker, met the city officials and submitted this proposition:

"First—The Cumberland-Bell company will take over the contracts and indebtedness incurred by the municipal company, which indebtedness, counting lawyers' fees in both the city's suit against the Bell and the private suit against the municipal company, amount to \$23,000.

"Second—The question of rates will be submitted to a committee of arbitration composed of a man chosen by the Bell interests, another chosen by the mayor, and these two to select a third. If the committee, after an examination of the books, finds that the company can give the same service now being given for less money, the Bell is willing to stand by its findings. The present rates are: \$2.50 for a residence telephone, \$5.00 for a Blake telephone for business houses, and \$5.50 for a solid back transmitter.

"Third—That, if after an examination of the company's earnings from the capital invested in the plant, the committee finds that the city should have a certain per cent. of the gross earnings, that the company would contribute yearly whatever amount was decided on to be reasonable.

"Fourth—In return for the assumption of all expenses so far incurred by the municipal company, and in view of the concessions granted by the Bell company, the city is to make a journal entry in the United States Court of Appeals, to whom the Cumberland appealed the case of the city of Evansville vs. Cumberland Telephone & Telegraph Company, stating 'that, the city of Evansville is hereby perpetually enjoined, through this entry by its attorneys, from ever interfering with the wires or poles of the Cumberland Telephone & Telegraph Company, in the streets and alleys of the city of Evansville.' "

The city attorneys, who are greatly worried, for political reasons, over the failure of the municipal scheme to work, nearly accepted the proposition. At once the Cumberland seemed to offer them a ready way to get out of the bad scrape and pay off all the indebtedness they have incurred. On investigation, they came to the following conclusion:

The journal entry would annul the city's present suit against the Cumberland company, and give it the right to stay in Evansville without a franchise. It was a situation without parallel in legal annals, yet when sifted to the bottom, such was the inevitable conclusion. The Cumberland attorney had been

sharp enough to hide this connivance against the rights of the city of Evansville under a most pretentious and alluring offer of seemingly liberal and fair concessions.

To probe the matter further, the attorneys for the Cumberland were asked their opinion as to how much the rates could be lowered. They replied that they thought that the committee on arbitration would find that the rates could not be lowered one cent, and if anything were too cheap now. Again, when asked what per cent. of the gross receipts they thought the city would receive, they replied that the books of the company show that it now is making less than 2 per cent. on its investment and that a reasonable finding of the committee would inevitably be that the city could not, in justice, ask any of the company's gross earnings.

This is the proposition that to-day faces the attorneys of the city of Evansville.

THE UTICA, N. Y., HOME COMPANY GIVES FREE TOLL SERVICE.

THE Utica Home Telephone Company has instituted free toll connections with the towns of Marcy, Washington Mills, Deerfield, Whitesboro, Oriskany, New Hartford, Chadwick and Willowvale. These towns vary in distance from four to eleven miles from Utica. The Bell Company charges toll to all of these towns, excepting Yorkville and New Hartford, which are each four miles from Utica. This innovation has caused such a great increase in the number of prospective subscribers that the contract force has been increased from three to eight men. An exchange has been installed at Whitesboro and one will be placed at Oriskany.

TRUNK LINE AGREEMENT IN WAYNE COUNTY, NEW YORK.

AN agreement has recently been reached with the Wayne-Munroe Telephone Company whereby an exchange is to be located at Red Creek. In the past all long distance connections in Wayne County have been made over the wires of the Empire State Telephone Company, a branch of the Bell system. The service has been very tardy and the apparatus poor. Many improvements had been promised but failed to materialize.

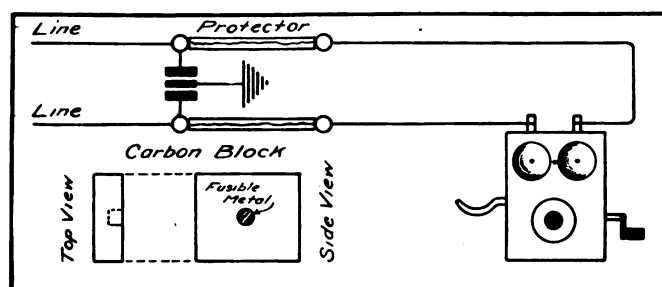
Two Independent companies, the Wayne-Munroe and the Ontario, have neared Red Creek in the extension of their lines. The Empire Company, to retain the business of the rural lines, offered to do the switching for the local lines at a certain rate per year on condition that Bell receivers and transmitters should be installed. As this would necessitate the abandonment of the telephones now in use, as well as the building of a metallic circuit, the proposition was rejected.

The principal specifications of the contract are: The Wayne-Munroe company is to install a modern switchboard in the business center of Red Creek for the use of the local lines. The members of the local companies are to pay a switch fee not to exceed 3 cents for each use of the board, to apply to the pay of an operator. The Wayne-Munroe company is also given the privilege of introducing local telephones within the corporate limits of the village, but not beyond, except by special permission of the local lines. Switching from the local companies to the Wayne-Munroe company's lines is to be free of charge. All outside busi-

ness coming over local lines to the exchange for points touched by the Wayne-Munroe or Ontario company's are to be sent over the long distance lines in preference to parallel local lines. The local lines may collect their regular fees, however, on such messages or any other of wire before they reach the switch. The contract is to be signed for one year, and if all the parties are satisfied at the expiration of that time the contract will be signed for five years.

THE PRINCIPLE OF PROTECTORS.

THE object of the protector is to prevent injury to the instrument from lightning or from an excessive current due to a cross on the line. It is the usual practice in most cities in install protectors in all cases where the entering lines cross or approach high tension wires, and by some companies protectors are installed at every station. The usual type of protector and the method of connecting it in circuit, is shown in the figure. The



entering lines are led to the instrument through fuses, a fuse being inserted on each side of the line. Each fuse is connected to a small carbon block, these being mounted on the protector, between the two blocks and insulated from them by a strip of mica is a third block, connected to ground. Each of the three blocks has imbedded in it a small piece of fusible metal, these pieces coming opposite one another, and the mica cut away from around them. Should the telephone be in use and a heavy current pass over the line, the fuses will be blown, the circuit opened and the instrument protected. In case of lightning or of a cross with a high tension line, the high tension current will jump the gap between the carbon blocks, fuse the metal and connect the blocks together, thus grounding the line and affording protection to the instrument.

RAPID JUSTICE BY TELEPHONE.

IT cost Alexander Robinson, of Indianapolis, \$10 to answer a local telephone call. When he put the receiver to his ear he heard this:

"Hello, is this Alex. Robinson?"

"Yes, this is Robinson. Who wants me?"

"I do. I am Justice of the Peace Smock."

"Well, what do you want, Squire?"

"I've got a complaint against you for having a seine net in your possession. Are you guilty or nor guilty?"

"Guilty, Squire, but what in the—"

"Guilty, are you? Well, I fine you five dollars and costs," and the Squire hung up the receiver.

TELEPHONIC PROGRESS IN NOVA SCOTIA.

UNITED STATES Consul-General Halloway, of Halifax, in his report to the department, makes note of the progress in the use of improved telephones throughout Nova Scotia. A new long-distance line of 292 miles of copper wire has been opened between Halifax and Sidney. The offices at either end are equipped with standard relay boards, including the latest improvements. The report of the company shows that in the Province of Nova Scotia there is one telephone in use for every 88 inhabitants. In the city of Halifax there is one to every 27, while in other towns the proportion is between 20 and 30. The report of the general manager of the Nova Scotia Telephone Company shows 790 miles

of pole line and 2,246 miles of copper wire. The total mileage of telephone wires in the province is 7,136. The total miles of pole line is 791. The number of telephones now in the province is 3,260, of which 1,801 are in the city of Halifax. The average number of calls per day per telephone is 11 compared with 7½ with the old system. Halifax answers daily 18,000 calls. Last year the company transmitted 14,000,000 messages. Long-distance lines unite Truro, Amherst, Bridgewater, New Glasgow and Windsor-Sidney. The rates for conversation for three minutes between Halifax and points in Cape Breton are \$1.25 each in the daytime and 65 cents at night, between 6 p. m. and 8 a. m.

AMERICAN TELEPHONE JOURNAL INDICES.

FOR VOLUMES 6, 7 AND 8.

ANOTHER supply of the above indices has been prepared and subscribers who could not be supplied at the time of their applications may by writing now have the copies that they desire. When writing state explicitly just which indices are required, and write plainly the address to which they are to be sent. Communications relative to this should be on separate sheets of paper and should concern index matters only.

RESULTS OF COMPETITION.

THE following questions were recently submitted to subscribers of 189 Independent exchanges in seventeen of the States:

Has competition resulted in better telephone service in your city?

1. By an improved service on the part of the Bell Company?

Answer: Yeas, 982; nays, 154.

2. As given by the Independent company?

Answer: Yeas, 1,245; nays, 26.

Has competition increased the number of subscribers?

Answer: Yeas, 1,261; nays, 8.

Has competition brought about greater civility and attention?

Answer: Yeas, 1,222; nays, 37.

Have rates been reduced by competition?

1. By reduction of Bell rates?

Answer: Yeas, 1,238; nays, 45.

2. By lower Independent rates?

Answer: Yeas, 979; nays, 120.

Would it be preferable to return to the conditions prevailing before competition?

Answer: Yeas, 14; nays, 1,245.

W. H. CLAPP GOES WITH INDEPENDENT TOLL LINES.

W. H. CLAPP, who has been acting in a special capacity for the American Telephone & Telegraph Company at St. Louis for a number of years, has been employed by the Independent Toll Line Committee and will represent it in an advisory capacity. Mr. Clapp's resignation with the American T. & T. Company takes effect May 1st, after which time he will give his entire attention to the Independent long distance development.

COMPULSORY CONNECTIONS IN ARKANSAS.

ALAW of Arkansas, passed in 1885, provides that all telephone companies shall connect their lines with any other company applying therefor without discrimination either as to cost or quality of service. A penalty of \$500 is prescribed for every violation, one-half of which goes to the prosecutor and one-half to the State, and under the law every subscriber can make the same demand and collect the penalty. Chapter 148, Sandell & Hill's Statutes of Arkansas.

Under this law the Texarkana Telephone Company, of Texarkana, a city partly in each of the States from which it takes its name, has instituted proceedings to compel the Southwestern Telegraph & Telephone Company to make connections with it. The legal proceedings follow unsuccessful friendly negotiations upon the part of the complainant for the privilege.

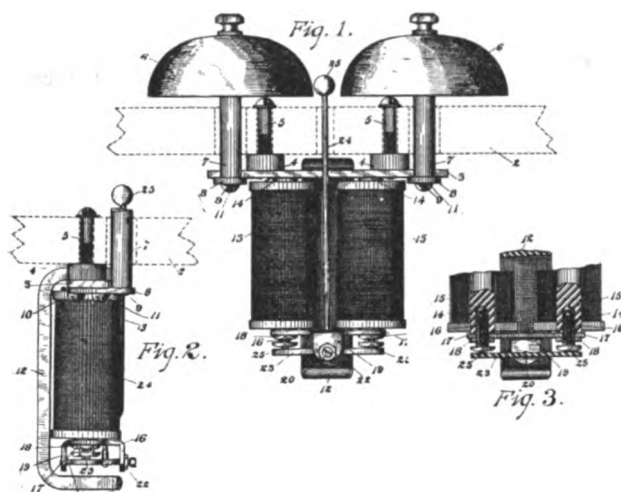
TELEPHONE



PATENTS

IMPROVED TELEPHONE RINGER.

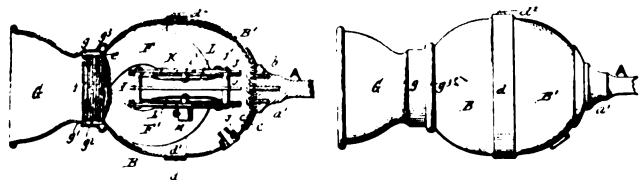
W. W. Dean, of Chicago, Ill., patents (No. 755,630) an improved telephone ringer, and assigns to the Kellogg Switchboard and Supply Company. This is an invention for improving the means of adjusting the armature of polarized bells with reference to the magnets so as to make the bell more sensitive and less liable to get out of adjustment. It has heretofore been common to arrange the support carrying the armature of the bell in such



a manner that it may be adjusted with reference to the magnet. This makes an insecure arrangement. By the present invention Mr. Dean provides the armature with a solid and fixed support, and arranges the cores of the magnets to contain adjustable pole pieces. Referring to the accompanying drawing, of which Fig. 1 is the front elevation, Fig. 2, the side elevation, and Fig. 3 a detail of the pole pieces, 2 is the support for the bell, which may be the frame of the box; 12 is the permanent magnet, arranged in the usual manner. 15 and 15 are the magnet coils, 25 the armature which is supported by means of the pivot 22 in the framework 19. The cores of the magnets, as shown in Fig. 3, are recessed, and in the cores movable pole pieces, 14, are inserted. These can be adjusted by means of the screws, 16, and lock nuts, 18.

IMPROVED TELEPHONE TRANSMITTER.

W. L. Wilhelm, of Buffalo N. Y., patents (No. 757,799) an improved telephone transmitter, and assigns to the Wilhelm Telephone Manufacturing Company, of Buffalo. This invention is an improvement upon the well-known Wilhelm transmitter which is



one of the double diaphragm variety. The object is to provide an easy method of mounting the two diaphragms, which the inventor attains by providing a framework of stamped metal, to which the diaphragms are clamped, the whole being surrounded by a globular casing. The invention is illustrated in this figure.

SIGNALLING APPARATUS.

E. A. Faller, New York, patents (No. 757,030) an improved method of signalling, and assigns one-half to J. W. Chisholm. In this patent Mr. Faller describes a new method of transmitting signals whereby at the receiving station a specially designed instrument may be made to record either the number of the party

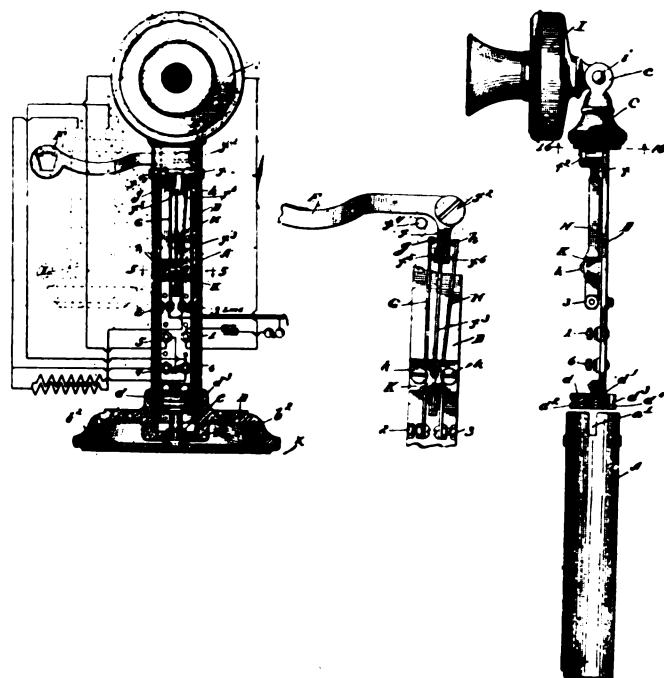
calling or the number desired, or may be made to display any other form of signal involving the service of different symbols. For this purpose Mr. Faller makes a novel use of the four circuits which may be made from a metallic line by using either the metallic pair, or one side or the other side of the line to ground, or both wires and ground. As this invention is exceedingly intricate the reader must obtain a copy of the patent in order to become fully conversant therewith.

SEMI-AUTOMATIC TELEPHONE EXCHANGE.

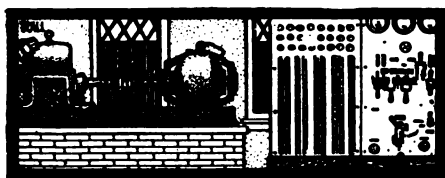
E. A. Faller, New York, patents (No. 757,031) and assigns one-half to J. W. Chisholm. In this patent Mr. Faller makes use of the device described in the preceding patent for displaying at the central office the number which any subscriber desires, thus obviating the necessity for listening keys and for any conversation between the operator and subscriber, and for this reason a switchboard installed on this plan is called semi-automatic.

IMPROVED TELEPHONE DESK SET.

H. P. Clausen, Chicago, Ill., patents (No. 758,031) an improved telephone desk set, which is shown in the illustrations, Figs. 1, 2 and 3. The objects of the invention are to provide a simple and efficient design of desk transmitter, in which the



mounting for the contact pieces, binding posts and other apparatus can be readily contained and from which they may be easily removed. Fig. 1 shows a front elevation, from which it will be seen that the hookswitch *F* operates by means of the lever and fork *f*, the contact springs *G* and *H*, while the spring *F3* furnishes the necessary motive force to operate the hookswitch *F*. As shown in Figs. 2 and 3, this hookswitch is supported upon a back piece *D*, which also carries the binding posts 1 and 6. Thus the transmitter head and the hookswitch are supported upon a single standard, which may be readily introduced within the tube *A* which forms the vertical standard of the desk set, as shown in Fig. 1. The standard *D* may be clamped inside the pedestal by means of the bolt *E* and is thus secured in place. It is also evident that as the binding posts, hookswitch and transmitter head are all solidly connected to a single back piece *D*, all the connections may be readily inspected and repairs easily made.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



CORD CIRCUIT QUESTION.—(324.)

Can you explain to me in what way the 40 ohm resistance, that is used in the Bell Company's cord circuit, serves to extinguish the supervisory signal, and also why it is that the supervisory relay contains a double winding?

D. F. O.

Referring to the first question, the 40 ohm resistance, in the cord circuit, Fig. 324, serves as a shunt circuit around the supervisory

coil. The effect of this combination is, that when the cord is in use the greater part of the current from the battery flows through the inductive winding, which operates the relay. The non-inductive winding acts as a shunt. The combined impedance of these two windings in parallel is generally less than 5 ohms, and consequently there is no appreciable loss in transmission due to the insertion of the relay in series in the talking circuit.

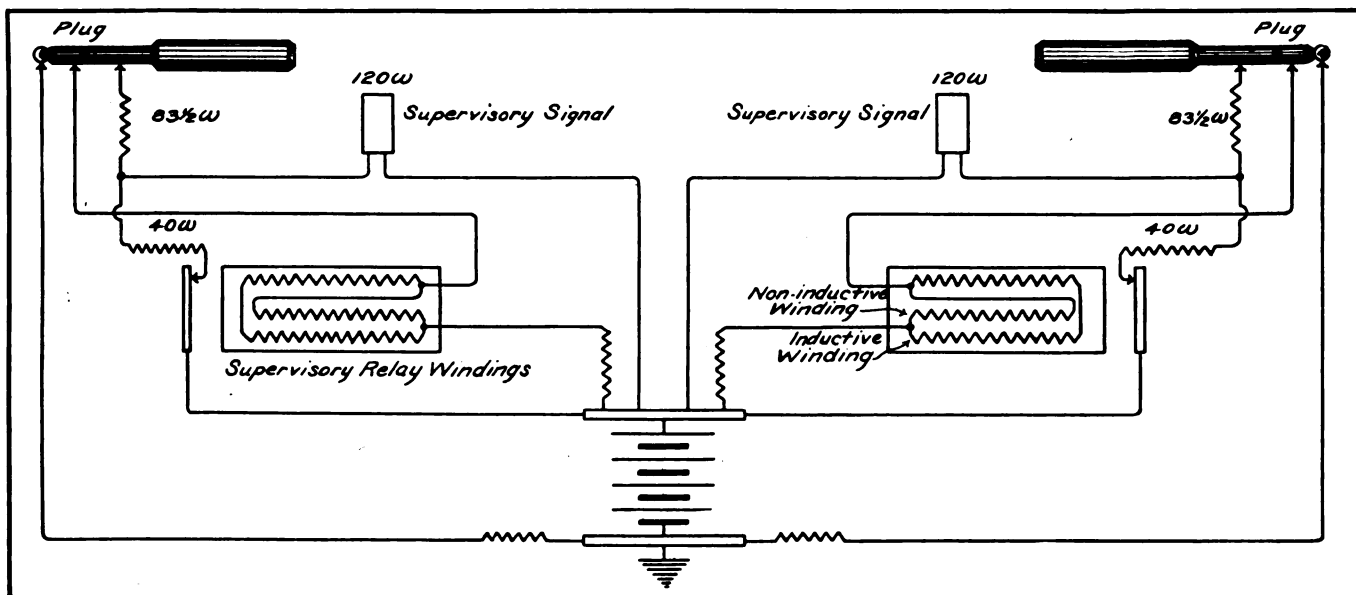


Fig. 324.

signal when the supervisory relay is operated. As will be seen from the wiring diagram of the cord circuit the 40 ohm coil is in parallel with the lamp, the resistance of the lamp being 120 ohms. When the plug is first inserted in the jack before the subscriber has answered, current flows from the battery through the 120 ohm lamp, through the 83 1/2 ohm resistance coil, to the sleeve of the plug, and thence to the sleeve of the jack and through the 30 ohm cut-off relay to ground, in this case lighting the lamp. By adding the resistances, which are in series, namely: $120 + 83\frac{1}{2} + 30 = 233\frac{1}{2}$, we find the total resistance through which the current for lighting the lamp must flow, and knowing the voltage of the battery to be 24 volts, we can calculate by Ohm's law the current that flows as follows:

$$C = \frac{E}{R}; E = 24; R = 233\frac{1}{2}; C = \frac{24}{233\frac{1}{2}} = .103 \text{ Amp.}$$

When the subscriber answers and the 40 ohm resistance is connected in the circuit, we have a new value for the total resistance. The combined resistance of 40 and 120 ohms in parallel is equal to 30 ohms, so that the total resistance from battery to ground is equal to $30 + 83\frac{1}{2} + 30$ or $143\frac{1}{2}$ ohms. Again applying Ohm's law, we find that $C = \frac{24}{143\frac{1}{2}} = .167$ Amp. Of this current three-fourths of it or .125 Amp. flows through the 40 ohm shunt, the remaining one-fourth, .042 Amp. flows through the lamp and this amount of current is not sufficient to light it.

Replying to the second question in regard to the double winding used in the supervisory relay, it is customary to wind these relays, Fig. 324, with two coils, one of which has a low resistance and is what is known as an inductive winding, that is to say, that during the passage of an alternating current through the winding, a counter-electromotive force is generated and the resistance offered to the flow of talking currents through the winding, is considerably more than that due to the resistance of the coil itself. The remaining winding consists of a high resistance non-inductive

SHUNT AND SHORT CIRCUIT.—(326.)

What is the difference between the terms shunt and short circuit? T. A.

The following is one definition: A short circuit is a circuit which offers practically no resistance to the passage of current, whereas a shunt is a circuit in parallel with another and having appreciable resistance.

AMPLITUDE.—(325.)

In reading telephone books I have come across the term "amplitude" in connection with sound vibrations, but cannot get a good definition of it from the dictionary. Will you please define it for me? T. D. A.

Wherever energy is transmitted from point to point by what is called wave motion, the particles of the material which exist between the two points are set in motion and pulsate to and fro. This pulsation is termed wave motion and the amplitude of a

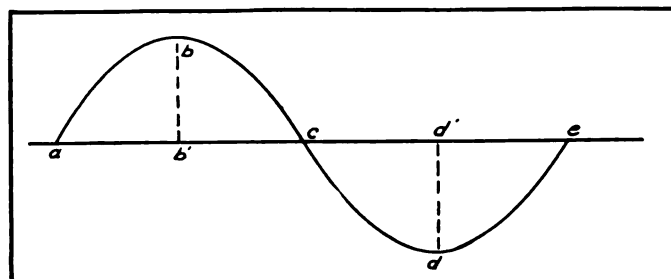


Fig. 325.

wave is the maximum distance which each particle moves to and fro. Thus, referring to Fig. 325: Suppose the line $a, b, c, d,$ and e represent a wave. Each particle will be moved a distance $b b'$ above the horizontal line $a e$ and a distance $d d'$ below the horizontal. These distances $b b'$ and $d d'$ are said to be the amplitude on either side of the horizontal, while the total amplitude or swing is the sum of $d d'$ and $b b'$.



THE WEEK'S MESSAGES

FINANCIAL

WATERBURY, CONN.—The Waterbury Automatic Telephone Company has increased its capital stock from \$10,000 to \$50,000.

CAMARGO, ILL.—The Home Telephone Company has increased its capital stock from \$4,600 to \$6,000.

SHERRARD, ILL.—The Home Mutual Telephone Company has increased its capital stock from \$10,000 to \$50,000.

BICKNELL, IND.—The Bicknell Telephone Company has increased its capital stock \$10,000. It increased the capacity of its switchboard and is making other improvements.

INDIANAPOLIS, IND.—The Delaware and Madison Counties Telephone Company has declared a 1½ per cent. dividend.

BOONE, IA.—The Boone County Telephone Company has increased its capital stock to \$150,000.

CLINTON, IA.—The Tri-City Telephone Company has increased its capital stock from \$135,000 to \$600,000.

WEBSTER CITY, IA.—The Martin Telephone Company will be re-organized with a capital stock of \$300,000.

GRAND FORKS, N. D.—The Red River Valley Telephone Company has increased its capital stock to \$50,000. Arrangements are being made to enter towns of Mayville and Hillsboro. It is expected that the Grandin line in Mayville and the Hurley line in Hillsboro will be purchased.

SYDNEY, N. S., CAN.—The Eastern Telephone Company, Ltd., at a special meeting held recently voted to increase the capital stock of the company by the issue of 3,000 shares, or \$30,000. J. H. Winfield, of Halifax, represented the Nova Scotia Telephone Company, and agreed that his company would take one-half the new stock issue.

NEW YORK, N. Y.—The American Telephone and Telegraph Company's monthly report shows a net output of 45,740 instruments.

HONESDALE, PA.—The Honesdale Telephone Company has authorized an issue of \$40,000, 30-year 5 per cent. gold bonds, secured on first mortgage on the property and franchises of the company to the Wyoming Valley Trust Company. The officers of the company are W. G. Harding, president; Charles West, treasurer, and A. E. Moot, secretary. The company has about 300 subscribers.

FRANCHISES

LONGMONT, COL.—The Northern Telephone Company has asked for a franchise for an independent telephone line.

GAINESVILLE, FLA.—E. E. Voyle has been granted a telephone franchise.

ROCKFORD, ILL.—The Home Telephone Company will construct a line from this city to Freeport, making connections with Pocatonia, Winnebago, Ridott and other points.

CHESTERTON, IND.—The City Council has granted a franchise to the Portage Home Telephone Company to construct, maintain and operate a telephone exchange in Chesterton. Rates are \$1 and \$1.25 per month for residence and business telephones, respectively.

CEDAR FALLS, IOWA.—The Cedar Falls Mutual Telephone Company, of Cedar Falls, Black Hawk County, is seeking a franchise here. Service will be given to Cedar Falls and connections made with farmers' lines. N. H. Harris is president; A. S. Brodie, vice-president; F. O. Jackson, secretary and manager, and O. H. Leonard, treasurer.

NORWOOD, MINN.—The Norwood-Young America Telephone Company has applied to the Glencoe council for a local franchise.

KANSAS CITY, MO.—The Home Telephone Company has asked the city council of Rosedale, a suburb of this city, for a franchise.

HUMBOLDT, NEB.—The city council has passed an ordinance granting a franchise to the New Mutual Telephone Company.

SWEDESBORO, N. J.—The People's Rural Telephone Company has been granted permission to construct its system here. It will also construct lines to Mickleton, Ruparpo, Bridgeport, Mullica Hill and Harrisonville.

ALEXANDRIA, N. Y.—The Johnstown & Croton Telephone Company has been granted a franchise by the city council for the construction of a telephone exchange which will be operated in connection with the Newark and other exchanges in Licking County.

DARIEN, N. Y.—The Darien Telephone Company has been granted a franchise to operate a system in Alden. Connections will soon be made with Alexander Village and Fargo.

CINCINNATI, O.—The Queen City Telephone Company expects to secure a franchise here.

TORONTO, ONT., CAN.—The Toronto Board of Control has decided that a competitive franchise shall be granted a telephone company to do business in Toronto. The company offering the best terms to receive the contract. The city will demand right to purchase the system at the expiration of the franchise and also have a percentage of the receipts paid to the city treasury.

EUGENE, ORE.—At a meeting of the Eugene city council, W. D. Varney, representing an Eastern electrical supply and telephone company, asked for a franchise to establish a local telephone system here.

ELECTIONS

BENTON, ILL.—The Tri-County Telephone Company, at a meeting held here, elected the following officers: J. T. Payne, of Mt. Vernon, president; W. B. Eaton, of Paradise, vice-president; C. P. Nesmith, of Mt. Vernon, secretary; J. J. Pierce, of Ewing, treasurer.

ARLINGTON, MINN.—The Farmers' & Merchants' Telephone Company, recently incorporated with a capital stock of \$10,000, has elected the following directors: Adam C. Buck, of Henderson, John Young, Frank P. Mansfield, Albert Zimmerman, Theodore Streissguth, Vincent Schmoll, Henry Hillerman and August C. Nollin, of Arlington.

SOUTH BEND, IND.—The South Bend Home Telephone Company has elected the following officers: Theodore Thorwald, president; Horace G. Miller, vice-president; E. F. Yarnelle, second vice-president; M. B. Staley, treasurer; Elmer R. Stoll, secretary. It was decided to install a section of switchboard, and a committee appointed to go over the outside plant and report on improvements and extensions. A 2 per cent. dividend was declared.

ARDMORE, I. T.—The Chickasaw Telephone Company at a meeting held here elected H. C. Potterf, president; Erwin Dyer, vice-president; W. S. Wolverton, secretary and treasurer; and W. H. Berry, manager.

BROWN, IA.—At the annual meeting of the Anson & Acasto Telephone Company the following officers were elected: David Rider, president; Frank P. Greenleaf, secretary; Marcus J. Bougher, treasurer. Jefferson Sutton, Charles H. Harr, directors.

SPRINGPORT, MICH.—The North Parma Telephone Company has held its annual meeting and elected officers.

WINTHROP, MINN.—At a recent meeting of the People's Independent Telephone Company the following officers were elected: C. M. Peterson, president; H. G. Witte, vice-president; J. A. Larson, secretary; C. A. Benson, treasurer; H. G. Witte, S. Hagberg, C. M. Peterson, C. A. Schilling, C. A. Benson, E. W. Olson and J. A. Larson, directors.

WARSAW, N. Y.—The Wyoming County Telephone Company at a meeting held here elected H. A. Pierce, president; N. H. Lewis, vice-president; E. B. Winsor, secretary, and M. N. Cole, treasurer. An exchange will be installed at Cadtile.

BUXTON, N. D.—The Red River Valley Telephone Company at a meeting held here elected the following officers: T. M. Smith, president; M. F. Hegge, vice-president; S. H. Hagen, general manager, secretary and treasurer. The general office of the company will be moved from Buxton to Northwood.

CHESTER, OHIO.—The Citizens' Telephone Company has elected William Stobart, president; S. A. McCullough, vice-president; J. S. Frank, secretary; Wendel Cants, treasurer.

GREENTOWN, PA.—The Cresco & Greentown Telephone Company at a meeting held at Canadensis elected J. A. Seguin, president; La Fayette Price, vice-president; Fred Feltham and S. B. Mikels, secretaries, and S. Shively, treasurer.

PHOENIXVILLE, PA.—The Phoenixville Telephone Company, recently organized, has elected the following officers: Horace Lloyd, E. C. Meier, Dr. Eldridge, Frank E. Bader, R. S. Allebach, Ambler Davis, William Ellis, Andrew Whitaker.

AUSTIN, TEXAS.—At the annual meeting of the stockholders of the Texas Telegraph and Telephone Company the following officers were elected: C. C. Gibbs, of San Antonio, president; W. R. Hanley, of Austin, vice-president; E. B. Clyde, of Llano, superintendent. The old directors were re-elected with one exception. Judge T. D. Cobb, of San Antonio, was made a director to succeed Major E. W. Cave, deceased.

RICHARDSON, TEXAS.—The Richardson Telephone Company has elected Sam P. Harben, president; W. T. McKamy, secretary and treasurer. Extensive repairs were ordered.

COMBINATIONS

ARTHUR, ILL.—Lon Davis, of Cadwell, and Ethel Davis, of this city, have purchased the Arthur Telephone Exchange which has 159 telephones in operation.

FREEPORT, ILL.—The Freeport Telephone Exchange Company has sold some of its lines to the Pearl City Mutual Telephone Company.

ROYAL CENTER, IND.—G. S. Akers, of Ambia, Indiana, has purchased the Thomas McCoombs telephone plant in this city for \$3,500. He will at once install a new switchboard and make other improvements.

ELDON, IA.—The Eldon Independent Telephone Company, with about 250 miles of lines, has been sold to Clyde A. Mann, of Sioux City, Ia.

LOUISVILLE, KY.—The Home Telephone Company has purchased the Bloomington Telephone system of Bloomington, Ind.

AMSTERDAM, N. Y.—It is rumored that the Amsterdam Automatic Telephone Company and the Glen Telephone Company will consolidate.

PRATTSBURG, N. Y.—The Overland Telephone Company, of Prattsburg, has purchased the Horton-Brush line through Italy.

GARLAND, TEX.—T. S. Walker has sold the Garland Telephone Exchange and toll lines to E. J. Fink, who later transferred the properties to Edward A. Smith for \$3,400.

EASTON, PA.—The New Jersey and Pennsylvania Telephone Company, with exchanges at Belvidere and Phillipsburg, N. J., and Easton and Bethlehem, Pa., and which operates several other branches, has been sold to J. Davis Brodhead, the attorney for the bondholders, for \$25,000.

PERSONAL

WILLIAM DONACHIE has been appointed manager of the Pittston exchange of the Pennsylvania Telephone Company.

MR. J. J. MACKIN has been appointed manager of the Tunkhannock and Wyoming Valley Telephone Company.

MR. J. C. GRIFFIN has installed a telephone system at Matthews, N. C.

B. W. MAYO has resigned as wire chief of the Bell company at Salt Lake City, Utah, and has been succeeded by W. H. Kline.

H. B. WALTHALL has been promoted to the managership of the Cumberland company's exchange at Lake Charles, La.

MR. S. A. LANCASTER, manager of the Cumberland Telephone Company at Fulton, Ky., has recently been married to Miss E. Finch, of McKenzie, Tenn.

MANAGER STOCKWELL, of the Ontario Telephone Company, Oswego, N. Y., represented that company at a conference held in Rochester for the purpose of effecting a consolidation of the different systems and increasing the long distance service.

GENERAL MANAGER DRISCOLL of the Wayne-Monroe Telephone Company represented that company at a meeting held at Red Creek, N. Y., for the purpose of uniting the interests of the various companies represented.

BULKLEY & DURAND, patent attorneys, Chicago, Ill., announce the removal of their offices to suites 14-28, 14-29, 14-30, Monadnock Block.

MISCELLANEOUS

TUCSON, ARIZ.—The Gila Valley Company has inaugurated an all-night service at Clifton.

DANVILLE, ILL.—The new building of the Vermillion County Telephone Company, to be erected here, will cost \$16,000.

MILAN, ILL.—The Union Telephone Company has instituted a five-minute free telephone service to all the rural lines entering here.

NEW CASTLE, IND.—The Cadiz Telephone Company has severed its connection with the Bell company.

COURTLAND, KANS.—The Courtland Telephone Company, which was recently incapacitated through a fire damaging its poles and lines, is now in shape again.

SOUTH BEND, IND.—The new directory issued by the Home company shows a total of 2,843 subscribers.

NEWARK, N. Y.—The Newark Independent Telephone Company now has connection with over 2,800 subscribers.

UTICA, N. Y.—The West Shore Railway Company is building a heavy copper circuit for their exclusive use between New York and Chicago.

UTICA, N. Y.—The Utica Home Telephone business opened its exchange April 1, 1903, with 1,300 working telephones, and to-day it has 2,700 in use, also an exchange at Whitesboro, with 158 telephones. The Bell company has reduced its residence rate to \$15 per year on a party line to meet competition.

NAZARETH, PA.—The Slate Belt Telephone Company has issued a new directory, which indicates this company's flourishing condition. It now has twenty subscribers where the Bell has one. The territory covered by the company includes the towns of Nazareth, Bangor, Ben Argyl, Portland and Bath. The officers are C. Miller, president; J. A. Miller, vice-president and general manager; L. C. Williams, treasurer, and Rollo Steer, general superintendent.

PHILADELPHIA, PA.—The Keystone Telephone Company's April directory has a list of 14,500 subscribers, an increase of 1,500 over the January number. The Atlantic City line of this company will be open about May 15th, making connection with the Atlantic Coast Telephone Company, which has 1,600 subscribers.

NASHVILLE, TENN.—The Cumberland Telephone Company is installing street telephone stations.

WHEELING, W. VA.—The National Telephone Company is installing selective ringing instruments for their party lines.

UNDERGROUND

CLARION, IA.—The telephone wires in the business district of Clarion will be placed underground.

LA CROSSE, WIS.—The city council has passed an ordinance compelling all telephone and telegraph wires to be placed underground.

NEW COMPANY NOTES.

COUNCIL GROVE, KANS.—The Council Grove Telephone Company of Morris County is now giving service to over 500 subscribers in Council Grove and Morris County. Anson Miller, the manager, reports growing business. The rates are: Business, \$24 a year, and residence, \$15.

ELBA, NEB.—The Howard County Telephone Company has been incorporated with a capital stock of \$25,000. Service will be given to the towns of Elba, St. Paul, Danneborg, Boehus and Farwell, and a number of rural lines will be built. The officers are E. M. Brass, president; M. A. Frigate, vice-president; P. Jepson, secretary; C. C. Hauser, treasurer and P. G. Frandsen, manager.

WEST ALEXANDRIA, OHIO.—The Preble County Telephone Company has been incorporated with a capital stock issue of \$25,000. Service is to be given to the towns of West Alexandria, Dadsville, Ingomar, Gratis, West Elton, and Greenwich. The officers are: J. S. Steward, president; J. J. Butner, vice-president; A. M. Fudge, secretary and treasurer. This company is the merger of the West Alexandria Telephone Company and the Southwestern Ohio Telephone Company of Gratis, Ohio.

GRANITEVILLE, S. C.—The Graniteville Telephone Company has been organized with a capital stock issue of \$2,500 to give telephone service to the towns of Graniteville and Warrentonville. Service will be started about May 15th with 60 subscribers.

MANITOWOC, WIS.—The Silver Creek Telephone Company has been organized to give telephone service in this township. The president is Ernest Heisallhirst; vice-president, Herman Stradifsoff; secretary, Peter Mason; treasurer, Henry Horfar.

PICKITT, WIS.—The Utica Telephone Company has been organized with a capital of \$5,000 to give telephone service in Winndago County. The main exchange will be at Pickitt, with two smaller exchanges in neighboring towns. The officers are: M. F. Munsell, president; J. G. Pickitt, secretary; A. Parkes, manager.

CONSTRUCTION

BALLS FERRY, CAL.—The Balls Ferry Telephone Company has voted to construct a new line from here to Anderson. D. L. Grover is president of the company. Robert Reading, T. D. Goodman, L. D. Cheney and Edward G. Carter will construct a private line from here to Cottonwood.

DANVILLE, ILL.—The Vermillion County Telephone Company of Danville will erect a new building and install a new system at the cost of \$16,000.

LEXINGTON, ILL.—The Prairie Hall Telephone Company of Lexington will install a new switchboard soon.

SPRINGFIELD, ILL.—The Interstate Telephone Company is installing a system at Peoria.

ELKHART, IND.—Farmers of Cass County, Michigan, met at the office of the Home Telephone Company and organized to construct a line and exchange about six miles north of this city, with connection with the local company.

SOUTH HAVEN, MICH.—The Kebbie Telephone Company is building a line between Covert and South Haven.

AMERICUS, KANS.—Merritt Lamb has secured a franchise to construct the Allen Creek line within the city limits. It will probably connect with the Americus office of the Comiskey Telephone Company. A. W. Worall is arranging for the construction of a line from Bushong into Americus. He will probably install a local exchange.

HARLAN, IA.—The Harlan & Avoca Telephone Company will move to new quarters where a new switchboard will be installed and other improvements made.

CASEY, IA.—The Casey Mutual Telephone Exchange has commenced construction of a plant in this town.

GLYNDON, MINN.—A rural telephone system, with principal exchange at Glyndon, and branches to Averill, Stockwood and Moland is being organized.

TORDENSKJOLD, MINN.—The Independent Mutual Telephone Company will build 35 miles of line and perhaps more.

BENBOW, MO.—A telephone line is being constructed from here to Philadelphia, a distance of about six miles.

KIRKSVILLE, MO.—The Kirksville Telephone Exchange is constructing a new telephone line here to Edina, a distance of about 25 miles.

WEYBURN, N. W. T.—The Weyburn Telephone Company of this town will construct a line from North Portal to Nilestone, and thence to Regina and Moose Jaw.

CANASTOTA, N. Y.—John W. Souther, chairman of the business men's committee, having in charge the matter of an independent telephone company for this town, is receiving bids and specifications from several manufacturers preliminary to the organization of a local company. Many business men are anxious to take stock in the new company.

CAROLINE DEPOT, N. Y.—The Caroline Telephone Company will extend its line to Ellis, and from Spendsville for several miles.

FAIRPORT, N. Y.—The Inter-Ocean Telephone Company has been overhauling its plant there and will build an aerial cable line.

GOWANDA, N. Y.—The Warner Telephone Company, recently organized, with a capital stock of \$50,000, will install an up-to-date telephone exchange, which will connect with the long distance lines of the Inter-Ocean Telephone and Telegraph Company, and will make connections with South Dayton, Silver Creek, North Collins, Cattaraugus, Springville and Arcade.

NEW BERLIN, N. Y.—The New Berlin Telephone Company will build lines to King Settlement and South New Berlin during the coming summer.

HONESDALE, PA.—The Citizens' Telephone Company is remodeling its system here.

UNIONTOWN, PA.—The Tri-State Telephone Company is constructing a line from Connellsville to Pittsburg.

BUTLER, S. D.—At a meeting held here recently it was decided by those interested to construct lines running from this place to Artesian, Mitchell, Letcher and other points.

CLARKESVILLE, TEX.—The Farmers' and Merchants' Telephone Company have extended their line to Texarkana.

TAYLOR, TEX.—The Williamson Telephone Company is extending its lines in this city and surrounding country.

DOUGLAS, WYO.—A. A. Spauld, of Mannville, will construct a telephone line from Lost Springs to Orin Junction, a distance of eight miles.

TUNKHANNOCK, PA.—The Tunkhannock and Wyoming Valley Telephone Company will be extended to Dallas.

WHITE ROCK, S. D.—The farmers east of White Rock are canvassing subscribers to a new farmers' telephone system.

PARIS, TEX.—The Citizens' Telephone Company of Paris has let a contract to J. W. Smith, of Beaumont, for the construction of other toll lines. An exchange will be established at Sherman, connections will be established with Hugo, Indian Territory, Beaumont and other places. The company will own 75 miles of toll lines besides its exchanges. E. W. Dunaway, of Chicago, has been elected as manager of the company.

SANGER, TEX.—The Independent Telephone Company is constructing a line from Gainesville to Fort Worth. It will install an office at this place.

MONROE, WIS.—Arrangements are being made to extend the pole line of the United Telephone Company from Clarno to Freeport. An exchange will be put in at Orangeville.

MORGANTOWN, W. VA.—The People's Telephone Company has signed a contract with the Point Marion Telephone Company for a metallic line to that place. They will then construct a line to Uniontown.

ST. CROIX FALLS, WIS.—The St. Croix Mutual Telephone Company will establish a telephone system at Blaine.

A FARMER EXPERT.

SOME time ago a line was strung into the country for some farmers. One old fellow who had been a very energetic farmer in his day was very much interested, and was invited to visit the exchange. He took great interest in the switchboard, which was about 1,500 lines, and said he guessed he understood it all right, as he used to be real handy fixing machinery—binders, reapers, etc.—only he wanted to know what those girls were everlastingly sticking those pins into that board for.

BOOK REVIEWS.

THE TECHNOLOGICAL & SCIENTIFIC DICTIONARY. Edited by G. F. Goodchild. Published by George Newnes, Ltd., Southampton St., London, W. C., England. Price, One Shilling.

This is the first number of the Scientific Dictionary which is to be published in serial parts. The entire work will comprise about fifteen numbers and is to be issued monthly. The intention is to furnish a concise technical dictionary of scientific terms, including therein only those which are commonly used in physics and engineering and excluding medical and allied sciences. In some respects the work is a little more than a dictionary and a little less than an encyclopedia, for, in many cases, each term is accompanied with considerable explanation. In this respect its method of compilation resembles that of the Century Dictionary.

TRADE NOTES

THE CENTRAL ELECTRIC COMPANY, of 246 Fifth avenue, Chicago, Ill., has just issued a folder descriptive of the situation in the far East, giving a map of the territory now in dispute and several tables of statistics relating to the competing forces. This is accompanied by a tale describing Okonite wires.

THE F. BISSELL COMPANY, of Toledo, O., is sending out an attractive little booklet entitled "A Comfortable Upper Berth in a Pullman Car," embracing within its covers a full description of the "Security" specialties manufactured by the Biswell Company, which are especially intended for the telephone trade.

THE S. H. COUCH COMPANY, 162 Pearl street, Boston, Mass., report large sales on its "Workwell" telephone. This set fills a long felt want, it being a thoroughly reliable battery call telephone at a low price. These telephones retail at \$7.50 per pair; there is, however, a liberal discount to dealers. The above company has prepared an interesting circular on same and will gladly mail it to any one interested.

GILDART BROS., of Albion, Mich., have issued a neat booklet illustrating the different styles of toll tickets they print. Besides the toll tickets there is a special form of trouble ticket which records both the operator's and inspector's reports. These tickets are designed to meet all descriptions and sizes of service, and to those who are looking for an effective style of ticket this pamphlet will be of especial interest.

THE CROCKER-WHEELER COMPANY, manufacturers of electric generators and motors, will on May 10th open a branch office in the Hibernia Bank Building in New Orleans. Mr. W. P. Field, of the St. Louis office, will be the representative in charge. Although there are fifteen Crocker-Wheeler branches from Boston to San Francisco, including St. Louis and Atlanta, the establishment of this new office has become necessary to accommodate the steadily increasing market for electric machinery in the South and Southwest.

THE AMERICAN SCHOOL OF CORRESPONDENCE at the Armour Institute of Technology, Chicago, Ill., has lately issued a bulletin descriptive of its methods. The opening pages contain a list of the faculty together with their portraits, and some paragraphs upon the object and methods of what the American School offers to its students. The rest of the volume is devoted to a series of synopsis of the various courses, each one of which is carefully described and thoroughly illustrated. All those who are interested in correspondence instruction would do well to procure this bulletin.

THE STERLING ELECTRIC COMPANY, of Lafayette Ind., reports an unusual activity in switchboard work, having contracted for switchboards and additional equipment during the past month for: Kansas, Ill.; Cairo, Ill.; Brookville, Pa.; Newton, Ill.; Clinton, Ill.; Austinburg, O.; Hudson, N. Y.; Decatur, Ill.; Stockbridge, Mich.; Racine, Wis.; Abilene, Tex.; Straughn, Ind.; Sheboygan, Wis.; Albany, N. Y.; Sully, Ia.; Peru, Ind.; Canton, Ill.; Webster City, Ia.; Auburn, Ind.; Tremont, Ill.; Russiaville, Ind.; Hoopes-ton, Ill.; Goldsmith, Ind.; McArthur, O.; Zionsville, Ind.; Chardon, Neb.; Seymour, Ind.; Avery, Ind. The list comprises sales of their well known type of multiple common battery boards, as well as the standard Bell type magneto board.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, is experiencing a rapidly increasing demand for its bridging toll line and country party line telephones, especially for four-party selective signalling systems. The instruments are equipped with its well-known transmitter, special arm with all binding posts, connecting wires and terminal screws concealed, double-pole adjustable horse-shoe magnet receiver, special high wound ringer and heavy generator. These instruments are especially adapted for rural systems, having no exposed metal parts forming any part of the circuit at any time and having all connecting wires, terminal screws and binding posts fully concealed to prevent parts accidentally becoming disconnected and leaving absolutely no danger from lighting while using the instrument.

A. C. SCRIBNER, of Gloversville, N. Y., has recently put on the market a combination bench lathe which is especially intended for the use of telephone companies. This machine is built in the best mechanical manner, and is in every detail a perfect machine. Furnished with the machine is a drill chuck which will hold the smallest drill up to $\frac{3}{8}$ size; a special slide and spool and complete set of parts by which all styles, kinds and makes of telephone coils can be unwound and rewound in a rapid and perfect manner. It also has an adjustable screw center with removable block which can be used for general buffing and grinding purposes by removing one nut, taking out chuck and spindle, and placing emery wheel on spindle, makes it a perfect grinding machine; and it has a sliding rest which can be adjusted to any point on the base, and is firmly held by a screw bolt on bottom. This machine will pay for itself in one season in repairs on burnt-out coils, and it will last for years.

THE CHICAGO WRITING MACHINE COMPANY, of Chicago, announces that among the latest automatic exchanges to adopt its toggle arm principle in connection with the desk set is the Citizens' Telephone Company of Grand Rapids, Mich. These arms practically make the automatic desk set as economical as the Adjustaphone. The Chicago Writing Machine Company, 105 Wendell street, who manufactures the Adjustaphone, and who furnish the toggle arms for the automatic desk sets, reports a steadily increasing volume of business. Inquiries are being received from many of the new exchanges throughout the country, and from newly incorporated companies who are endeavoring to put in at the start the most efficient and economical apparatus obtainable. The Chicago Writing Machine Company claims that the Adjustaphone will save its cost inside of a year by decreasing the cost of maintenance of the desk set. As the Adjustaphones are a great convenience

to subscribers many managers of Independent companies find that their subscribers are willing to pay a higher rental for the Adjustaphone, and the companies are therefore perfectly willing to put them in in place of the old-style desk sets. By purchasing Adjustaphones without transmitter and receiver, the transmitter and receiver in use on the old desk stands can be utilized. The manufacturers will be glad to furnish descriptive matter at any time on request.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—Very liberal telephone franchise in hustling Western town of 5,000 population. For particulars, address I. S. MAHAN, Le Mars, Iowa. 172

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL.

GILDART BROS., Albion, Mich. 168

WANTED—Second-Hand Telephone Apparatus, Central Energy and Magneto Switchboards, Magneto Bells, Telephones, Transmitters, Cable Terminals, Cross Connecting and Distributing Racks, Ringing and Charging Generators. Write immediately, price, condition and make. "C. E. W.," 17 S. Elizabeth street, Chicago, Ill. 167

WANTED—A competent shopman who can lay out switchboard work according to diagrams given him, and who can act as foreman of repairs in small shop. Address Box 173, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 173

POSITION WANTED.—Have had extended experience in engineering, construction, equipment and management of Bell and Independent exchanges. Graduate Electrical Engineer. Address Box 163, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 163

POSITION WANTED.—Experienced manager and engineer, desiring to make a change, will be at liberty June 1st. Has built and handled plants up to 10,000 telephones with success. Is fully conversant with all branches of the telephone business and with the most efficient and economical modern methods. Address Box 174, AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 174

POSITION—Energetic technically educated young telephone man desires managership of exchange of about 500 subscribers. Can operate economically and please subscribers. Will be at liberty May 1st. Can arrange to go to any good opening. Address, Box 160, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 160

WANTED—Position with good Independent company needing experienced man capable of building and maintaining local and long distance work. References regarding work and character. South preferred. Address Box 162, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 162

GETTING CARS QUICKLY

is not the only necessity in filling your Pole orders.

The cedar company must have the proper assortment of sizes.

That means us, every time.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Empire Building.

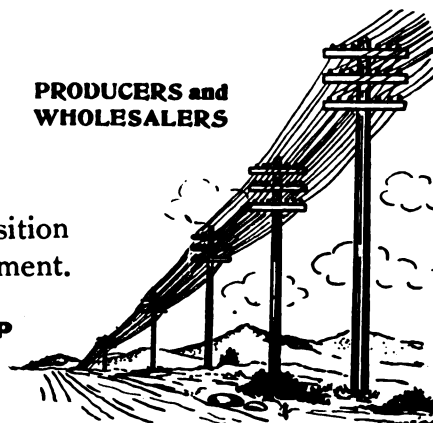
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.



"From the Stump
to the Line."

PRODUCERS and
WHOLESALEERS



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.



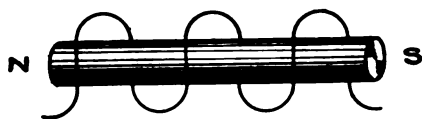
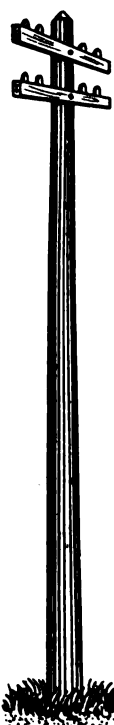
LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



THE POLES

of a magnet have to be magnetized to attract.

OUR POLES

attract on their merits alone. Write us now, telling us what you are going to build, and we'll tell you the poles you need and give you attractive quotations.

Sand Point Cedar Co.

SAND POINT, IDAHO

The Valentine-Clark Co.

Bag to announce to users of . . .

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

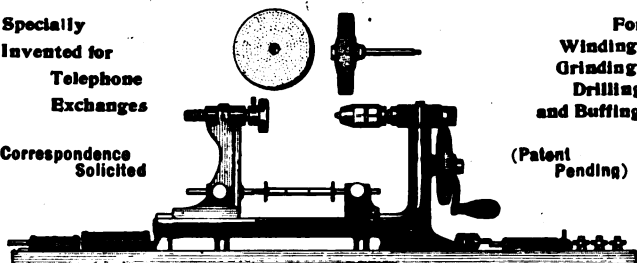
Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

THE EUREKA COMBINATION BENCH LATHE

Specially
Invented for
Telephone
Exchanges

Correspondence
Solicited



For
Winding,
Grinding,
Drilling
and Buffing

(Patent
Pending)

**A. C. SCRIBNER, MFR.,
GLOVERSVILLE, N. Y.**

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Stromberg-Carlson Telephone Mfg. Co. 4	Standard Underground Cable Co., Pittsburg, Pa. 12
Swedish-American Tel. Co. 12	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. 34
Telephone Printing Co. 34	
Valentine-Clark Co. 30	CABLE HANGERS.
Vought-Berger Co. 288	Bissell Co., The F., Toledo, O. 12
Wanted, Situations, etc. 6	Cook, Frank B., Chicago, Ill. 34
Western Telephone Mfg. Co. 34	Nagel, W. G., Electric Co., Toledo, O. 34
Weston Electrical Instrument Co. 33	National Telephone Supply Co., Cleveland, O. 12
Wisconsin Timber & Land Co. 29	Standard Underground Cable Co., Pittsburg, Pa. 12
Worcester, C. H., Co. 12	
Yesbera Mfg. Co. 12	CABLE SLEEVES.
	Nagel, W. G., Electric Co., Toledo, O. 12
ATTORNEYS.	New Haven Novelty Machine Co., New Haven, Conn. 12
Munk, Otto, New York City. 12	CARD INDEX SYSTEMS.
BATTERIES.	Telephone Printing Co., Defiance, Ohio. 12
Burnley Battery Co., Painesville, Ohio. 12	CIRCUIT CLOSERS.
Electric Appliance Co., Chicago, Ill. 12	Garton-Daniels Co., Keokuk, Ia. 12
Nungeesser Electric Battery Co., Cleveland, O. 12	CLIMBERS.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. 12	Klein & Sons, Mathias, Chicago, Ill. 12
BLANKS, BOOKS AND FORMS.	Nagel, W. G., Electric Co., Toledo, O. 12
Telephone Printing Co., Defiance, Ohio. 12	CONDUITS.
BONDS.	American Conduit Co., Chicago, Ill. 12
J. W. Middleton & Co., Chicago, Ill. 12	American Vittrified Conduit Co., New York. 12
BRASS.	Camp Co., The H. B., New York. 12
Benedict & Burnham Brass & Copper Co., Chicago, Ill. 12	Gest, G. M., Cincinnati, O. 12
Scovill Mfg. Co., Chicago, Ill. 12	Nagel, W. G., Electric Co., Toledo, O. 12
BOOTH.	Standard Vittrified Conduit Co., New York. 12
Yesbera Mfg. Co., Toledo, O. 12	W. S. Dickey Clay Mfg. Co., Kansas City, Mo. 12
CABLES.	CONNECTORS.
American Electric Tel. Co., Chicago, Ill. 12	Benedict & Burnham Brass & Copper Co., Chicago, Ill. 12
Bissell Co., The F., Toledo, O. 12	Cook, Frank B., Chicago, Ill. 12
Chicago Insulated Wire Co., Chicago, Ill. 12	McIntire Co., C., Newark, N. J. 12
Kellogg Switchboard & Supply Co., Chicago, Ill. 12	Nagel, W. G., Electric Co., Toledo, O. 12
Nagel, W. G., Electric Co., Toledo, O. 12	
National Wire Corporation, New Haven, Conn. 12	
Okonite Co., New York. 12	
Roebbling's Sons Co., John A., Trenton, N. J. 12	

CONTINUED ON PAGE 31.

OUR ILLUSTRATED PRICE LIST

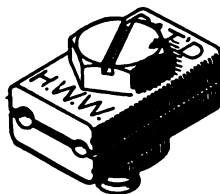


IS FREE

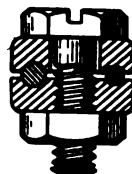
A POSTAL BRINGS YOU NEXT

S. H. COUCH CO.162 PEARL STREET
BOSTON, MASS.**"H. W. W." WIRE-CONNECTORS**

are used for making Test-joints in Telephone Wires on Toll or Exchange Lines. Each plate has two grooves of different depths.

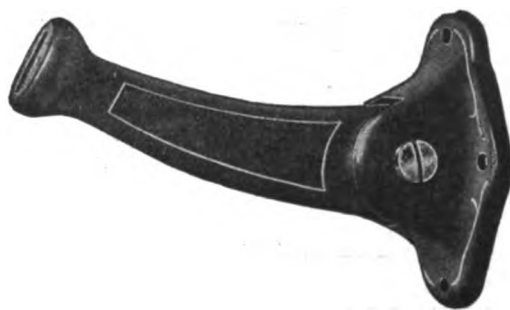


By reversal of one plate around the bolt, two wires of the same or of different diameters can be connected.



Simple and effective. Inexpensive and economical. Extensively used by large Telephone Companies. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
311-313 LAKE STREET, CHICAGO, ILL.

WE HELP TO MAKEA Good
Telephone

ADDRESS "BARRARM," CLEVELAND

ADVERTISERS' DIRECTORY—Continued**CONSTRUCTION SUPPLIES.**

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS and CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LATHES.

Scribner, A. C., Gloversville, N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

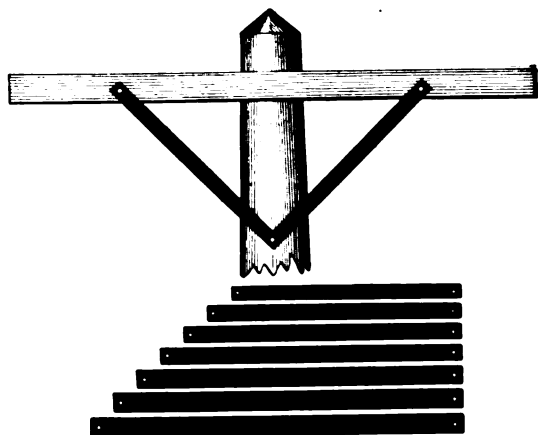
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

PLAIN

JAPANNED

GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

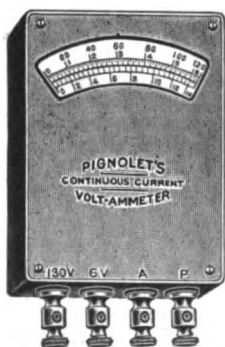
WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMONIE, WIS.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Cost of Construction Reduced
By Purchasing Chestnut Telephone
POLES and POSTS
From FRANK MULLEN, Ewing, IND.
Reasons Why for the Asking

LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES
For Special Use Carried in Full Stocks and
Sold at Reasonable Prices
THE MEDORA MILLING CO.,
MEDORA, INDIANA

Oak Insulator Pins and Brackets

Direct from North Carolina's immense
Forest to you.
Orders filled at once; no delays, no "cuss-
ing." TRANSPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

MICHIGAN CEDAR CO., Ltd. BAY CITY, MICH. CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices
Prompt Dispatch
Good Quality...

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US
L. Prosser & Son, SCOTTSBURG,
INDIANA.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:
Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. OHUROHILL

HERON, MONT.

YARDS { HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE



MARYLAND

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

FRANCIS
BEIDLER
& CO.
459-519 W. 22d St.
CHICAGO, ILL.

Pendleton & Gilkey

816 Lumber Exchange, Minneapolis, Minn.

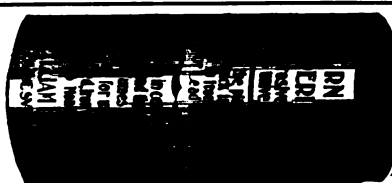
POLE PRODUCERS

You're sure of getting the lowest
price when you order from us. We're
producers, that's why.

Our Poles, too, are as fine as you'll
get anywhere. We think they're a
little better.

Try us the next time. Write
for delivered prices on ...

WHITE CEDAR POLES




Do you always mention the

American Telephone Journal
when writing to advertisers? It will be
appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross
ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

R. R. AZERS, Manager.
LEWIS LUMBER & MFG. CO., HATTIESBURG, MISS.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR**
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Blank Books and Forms
**FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.**

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

**The American
Telephone Journal**

**116 Nassau Street,
New York City.**

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
Rome, N. Y.

Keeling & Ridge Co.
General Contractors

Builders of Telephone and Telegraph Lines, Electric Railroad, Power Lines, etc. Conduit Work a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.
Main Offices, 551-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

MARLIN CABLE HANGERS

BEST QUALITY.

NATIONAL TELEPHONE SUPPLY CO., CLEVELAND, O.

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

WESTON STANDARD
PORTABLE
DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

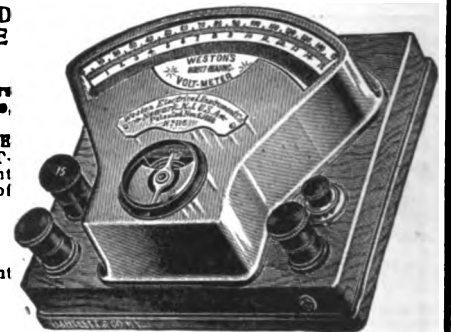
Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co., Ritterstrasse, No. 88.

LONDON—Elliott Bros. Century Works, Lewisham.

PARIS—FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.



Linemen's Outfits

Construction Tools

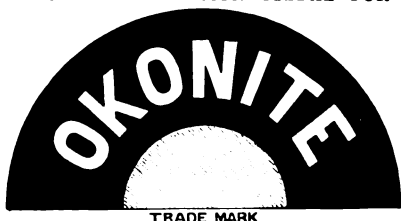
Write for our Catalogue and Net Price.

We make Linemen's Tools our Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

1889
PARIS EXPOSITION MEDAL FOR RUBBER INSULATION

1893
WORLD'S FAIR MEDAL FOR RUBBER INSULATION



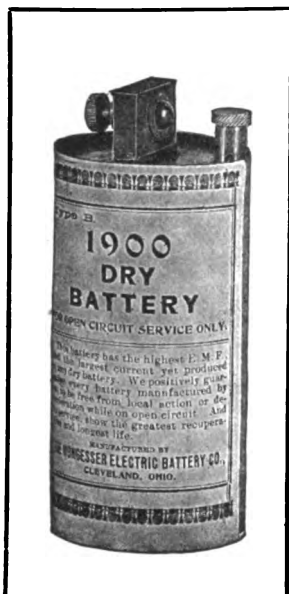
The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
Sole Manufacturers THE OKONITE CO., Ltd. 253 Broadway, N.Y.

WILLARD L. CANDEE, }
H. DURANT CHEEVER } **Managers**

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

THE "1900" DRY BATTERY



The 1900 Dry Battery is the thing for telephone and bell work.

Always ready. Clean—no slop.

Reliable and strong. Long lived—from 6 to 18 months, according to use.

This battery has been adopted by many of the largest Contracting and Operating Companies in the United States.

Write for prices. Also for catalog of telephone supplies.

THE F. BISSELL COMPANY TOLEDO, O.

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Send for Illustrated Booklet

Prompt Deliveries

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

**39-41 Cortlandt Street,
NEW YORK.**

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S
(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.



Automatic Telephones

**Privacy
Promptness
Precision
Profits**

Automatic Electric Co., Chicago, U. S. A.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Fostoria Electric Supply Co., Fostoria, Ohio.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

SIGNS.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

STATIONERY.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.

National Battery Co., N. Y. City.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.

Ericsson Telephone Co., N. Y.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Telephone Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

Bissell Co., The F., Toledo, O.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Leslie, A. C., & Co., Montreal, Can.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.

Cook, Frank B., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

McIntire Co., C., Newark, N. J.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Chicago Insulated Wire Co., Chicago, Ill.

Indiana Rubber & Insulated Wire Co., Jenesboro, Ind.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

National Wire Corporation, New Haven, Conn.

Okonite Co., New York.

Roebbling's Sons Co., John A. Trenton, N. J.

Scovill Mfg. Co., Chicago, Ill.

Spargo, James A., Wire Co., Rome, N. Y.

Standard Underground Cable Co., Pittsburgh, Pa.

SUBSCRIPTION BLANK

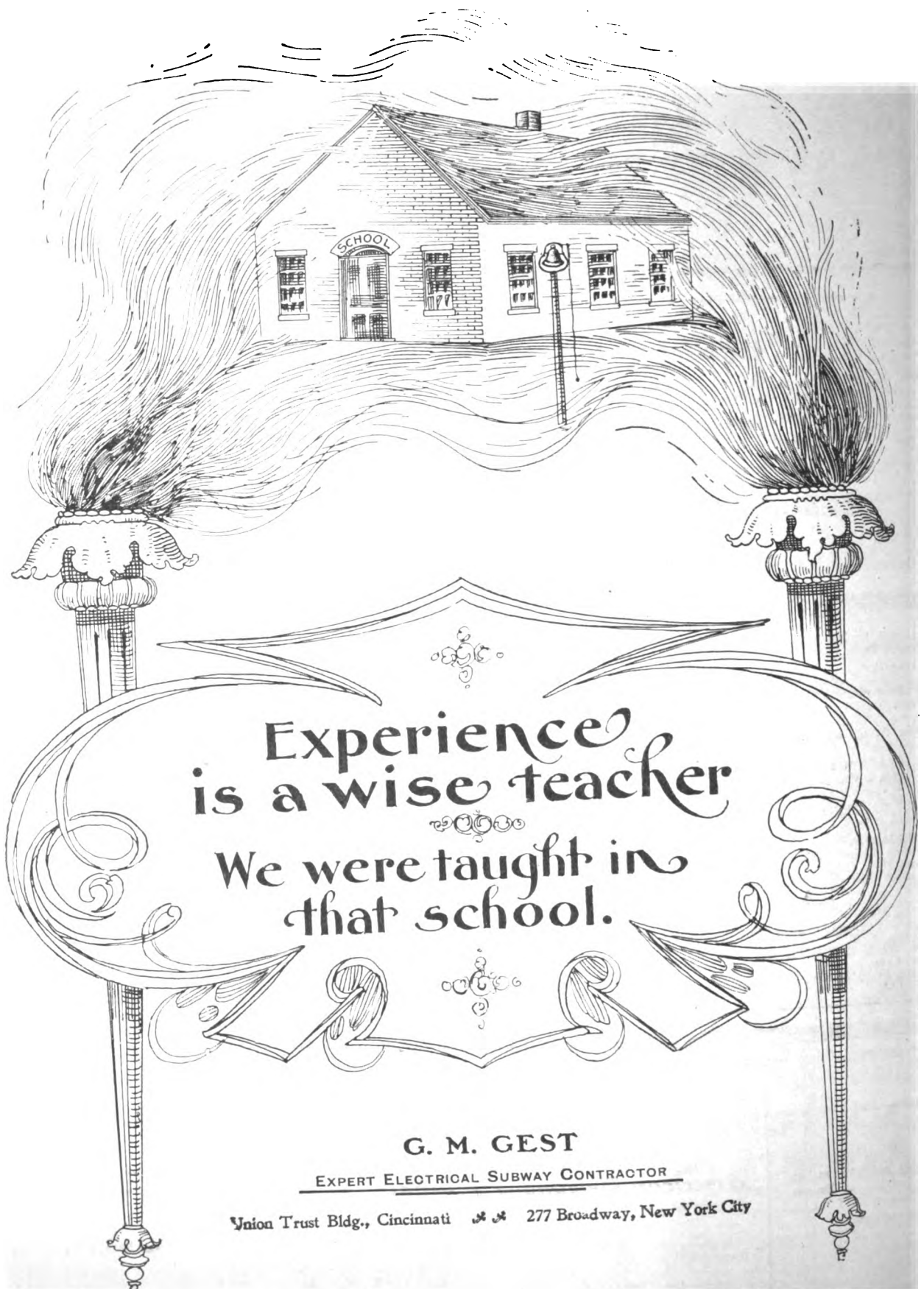
Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....



SCHOOL

Experience
is a wise teacher
We were taught in
that school.

G. M. GEST
EXPERT ELEOTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of
Philadelphia how they like our conduit. They
should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

4 MOST

4 EVER

Leich **4** Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

OR

MAGNETO

American Electric Telephone Company




SELECTIVE
IMPEDANCE
COIL



CHICAGO
ILL.



THE AMERICAN TELEPHONE JOURNAL



CONTENTS:

*The New Installation for the Berlin
Telephone Exchange*

*Progress of Long Distance Telephony
in Twenty-Five Years*

Condenser Making

By F. A. Wegner

Grave Charges Against Cumberland Bell

By W. L. Arnold, Special Correspondent

The Voltmeter as Used for Testing

By F. C. Greenwald

Automatic Fuse Alarm

By C. S. Bundeaman

A Simple Telephone Accounting System

By Edwin D. Schade

The Operating Field:

Indiana State Convention

Attended Convention by Telephone

Have Cut Out the Bell Business

The Cumberland Company Held Up


North Electric Company Wins Suit

Editorial

Patents—Queries

The Week's Messages—Trade Notes

WANT ADS. PAGE 304.



Edited by WILLIAM HENRY McDONOUGH

Volume 9

NEW YORK—MAY 7, 1904—CHICAGO

Number 19

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

YOU CAN RAISE YOUR OWN WAGES

By studying to make yourself more valuable. Knowledge shows itself on the pay roll, and if you want to be at the top you should

STUDY

TELEPHONY

during your spare time. Advancement means work, and if you cannot go to school we can do much to prepare you for a higher position. If you are interested, write us at once. You cannot know the pleasures of summer study until you have tried it.

A postal will bring our illustrated 200 page bulletin No. 9M, giving full outlines of all our courses. It is of special interest to Telephone men, as it gives synopsis of the instruction papers on Construction, Exchanges, Operation, Wiring, Maintenance, etc.

AMERICAN SCHOOL OF CORRESPONDENCE

3321 Armour Avenue,

CHICAGO,

ILLINOIS

Mention American Telephone Journal

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK** ♣ ♣ ♣

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

ECONOMY AND SATISFACTION?

**Use the Novelty Cable Sleeves,
Pot Heads and Y Branches.**

Here's a letter from one of our pleased customers:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.,
(Signed) W. H. DUKIN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

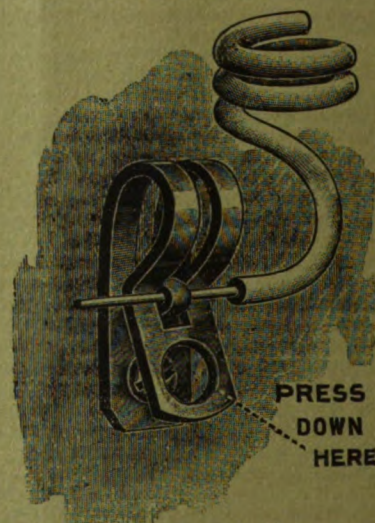
Why Not Write Now for That Trial Order?

**New Haven
Novelty Machine Co.,**

ELM AND STATE STS.,

NEW HAVEN,

CONN.



A SPRING BINDING POST.

Protected by Patent.

Grips the wire without the use of a screw. Grips any size wire that can be put into it and holds it so firmly that a loose contact is impossible.

Wire can be put in or taken out in one-tenth the time it takes to adjust a screw post and there is no possibility of the wire being broken off in the operation.

Just the thing for wire connections that have to be changed often because of the ease with which it can be done, and just the thing for wire connections that are to be permanent because of the surety of the contact.

The wire can not jar loose.

Contractors should demand this post on their electric bells and annunciators. It will insure their reputation for permanent work and save lots of complaints. Ask to have your dry batteries equipped with it and notice how easily they are connected up—and stay connected.

Just the thing for automobile batteries.

It is cheaper than any good screw post on the market and can take the place of an expensive one. Write to us about it.

THE FANNESTOCK TRANSMITTER CO., 74 Cortlandt St., N. Y. City
SWAZEY & SMITH, 53 State St., Boston, Mass., New England Selling Agents

EXTRA POWERFUL

There is always something new under the sun.
Now it is our No. 36 X-P Type Telephone.

It is built to do more work than any other telephone ever put upon the market, and is guaranteed to ring the twentieth telephone with eighteen receivers off the hook.

We will tell you more about it if you ask.

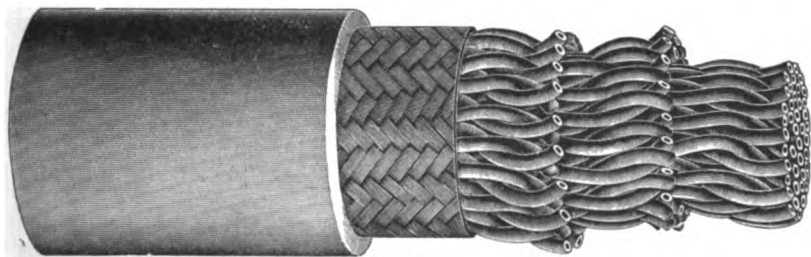
ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS—ELECTRICAL SUPPLIES

92 & 94 WEST VAN BUREN STREET CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.

Manufacturers of



“Paranite”

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

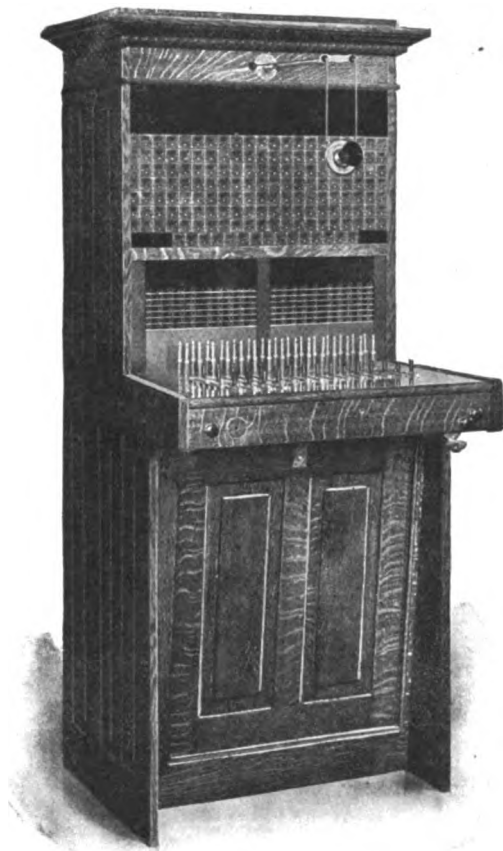
INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

SPECIAL

For a limited time we will sell Series Wall Telephones at the lowest price on record. Every telephone guaranteed for five years. For particulars, write us.

EASTERN TELEPHONE MFG. CO.,
WEST CHESTER, PA.

WHY THEY ARE BETTER



Cabinet No. A-1370, with G-C Visual Signals

Than any Manually Restored or Mechanically Self-Restored Drop Switchboard.

The Stromberg-Carlson Generator Call Visual Signal Switchboard.

Because—They are a faster operating board. The Operator has only a very small space to reach with the plugs, whereas on the self-restoring drop board the operator has to reach over the whole face of the board.

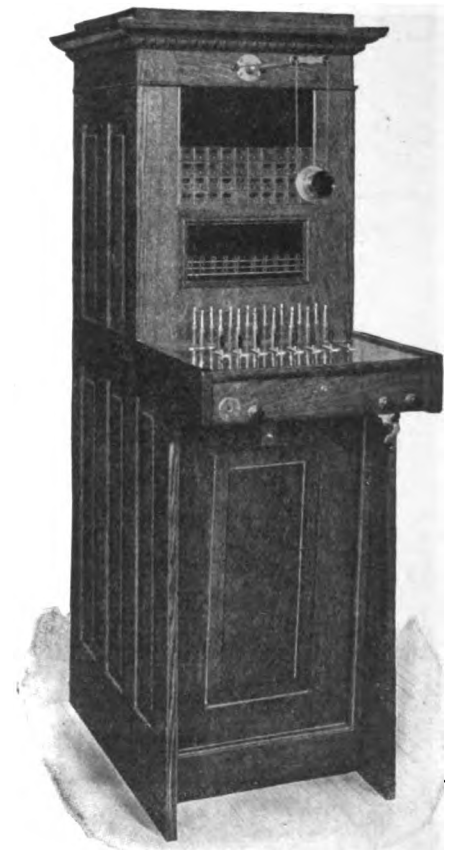
Because — It requires half the number of operators, thus paying greater dividends.

Because — The operator does not have to make a single move that she would not have to make in operating a Central Energy board.

Because — All signals can be restored instantly by pressing a key.

Because—All the working parts are inside of the cabinet and free from dust.

We can refer you to a number of exchanges that have been operating this kind of equipment for a long time. We would like to mail printed matter to all interested parties.



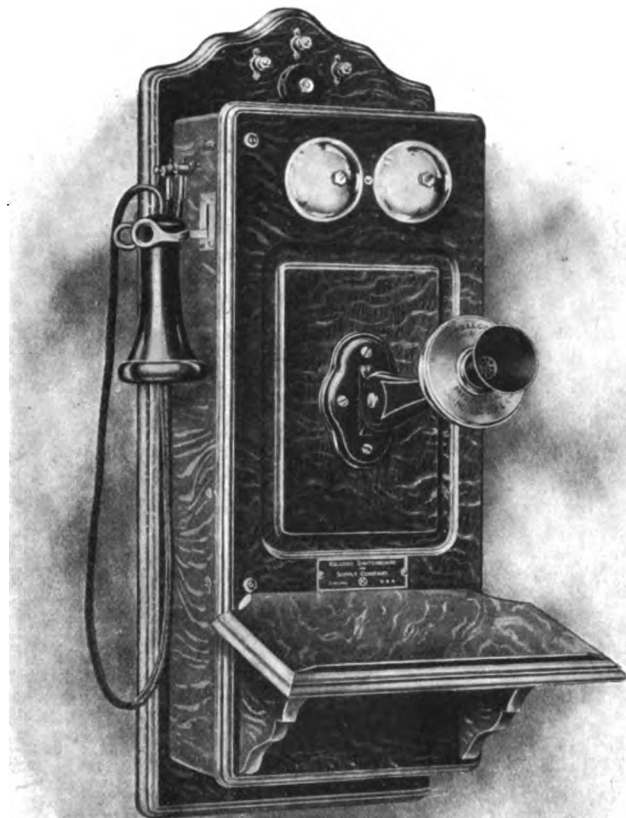
Cabinet No. A-884, with G-C Visual Signals

STROMBERG-CARLSON TELEPHONE MFG. CO.

General and Eastern Sales Office
ROCHESTER, N. Y.

Sales Department
CHICAGO, ILL.

Kellogg Magneto Telephones



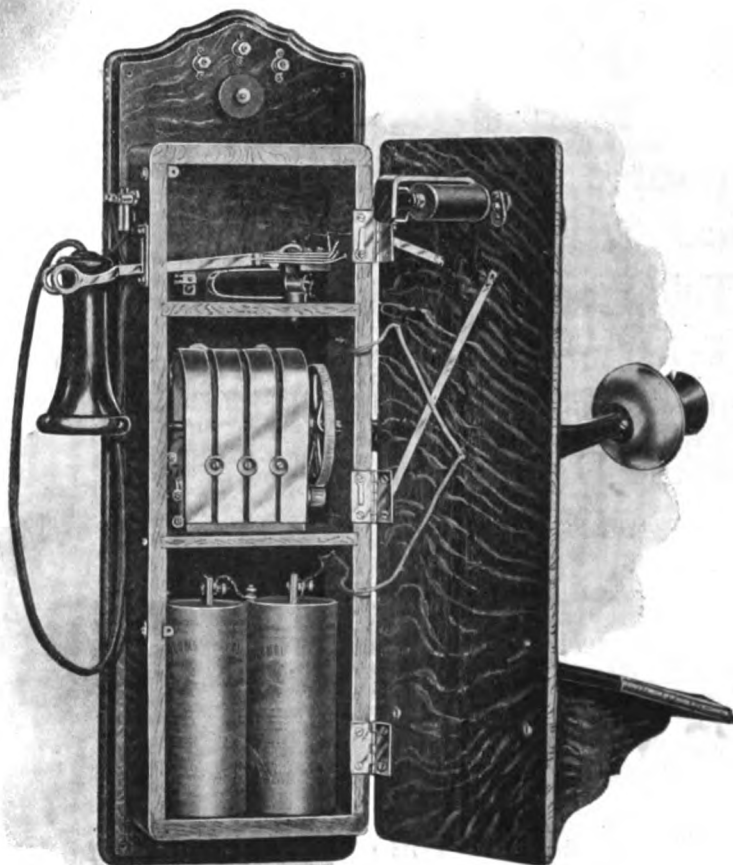
ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

*They are remarkably
durable, compact and
of handsome design.*

*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**

GREEN AND CONGRESS STS., CHICAGO



Electric Building Cleveland
Keystone Telephone Building, Philadelphia

WE WIN!!

Self-Restoring Drop Patent Suit

DECIDED IN FAVOR OF THE
Western Telephone Mfg. Co.

This suit was begun about 8 years ago, and is the *most important case* affecting the patents on independent telephone apparatus. It involves nearly every company in the business.

The suit was against the *American Electric Telephone Co., P. C. Burns, et al.*, and was decided Tuesday, April 12, 1904, in the *United States Circuit Court of Appeals !!!* at Chicago.

The defendants are found to be infringers, and the Court granted an injunction prohibiting the manufacture of all Mechanical Self-Restoring Drops; except those made by the Western Telephone Manufacturing Co., or its predecessor, the Western Telephone Construction Co. An accounting for all Drops used also was ordered.—*This decision is final.*—Write to us for a Copy of the Decision.

WESTERN TELEPHONE MFG. CO.,

42 W. Jackson Blvd.,

CHICAGO, ILL.

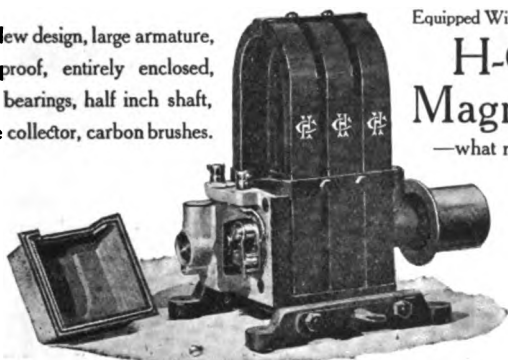
THE "PIONEER INDEPENDENT TELEPHONE FACTORY."

Hold There!

¶ One thing at a time. Just jot down in your memory that this is the most powerful

Magneto Power Generator manufactured.

¶ New design, large armature, dirt-proof, entirely enclosed, long bearings, half inch shaft, wide collector, carbon brushes.



Equipped With Heavy

H-C
Magnets
—what more.

The Holtzer-Cabot Electric Company
BROOKLINE, MASS. : : : : CHICAGO, ILL.

The Simple, Unpretentious Pulley!

Consider what the world of today would be without it, in its different forms.

But until recently the only part it has played in telephony has been to support a movable weight on the switchboard cord, allowing ample latitude for the plug, and at the same time precluding cord entanglements and difficulties. How else could this be accomplished?

We have made no great discovery—no radical departure—in conceiving

The Pendent Telephone

We have merely applied a practical device to give much-needed scope to the telephone, enhancing its convenience and utility, and rendering it wholly unobtrusive in disuse. It hangs from the ceiling, and Central is called automatically.

The VOUGHT-BERGER CO..

MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS, AND APPLIANCES,
La Crosse, Wis.

Special Offer!

FOR MAY ONLY.

To Introduce Our Latest

"1904 MODELS"

We are Going to Sell at a

Big Reduction

Knowing that each sale means for us permanent customers.

We have doubled our business in the past year by honest goods and square dealings. This year we want your co-operation. We only ask a fair trial to prove the quality.

Send now for New Bulletin No. 30 on Magneto Telephones.

**Largest and Most Complete
Telephone Factory in the East.**

**CONNECTICUT TELEPHONE
AND ELECTRIC COMPANY**
Meriden, Conn., U. S. A.

F. B. CO.

Famous Green and Black Duplex



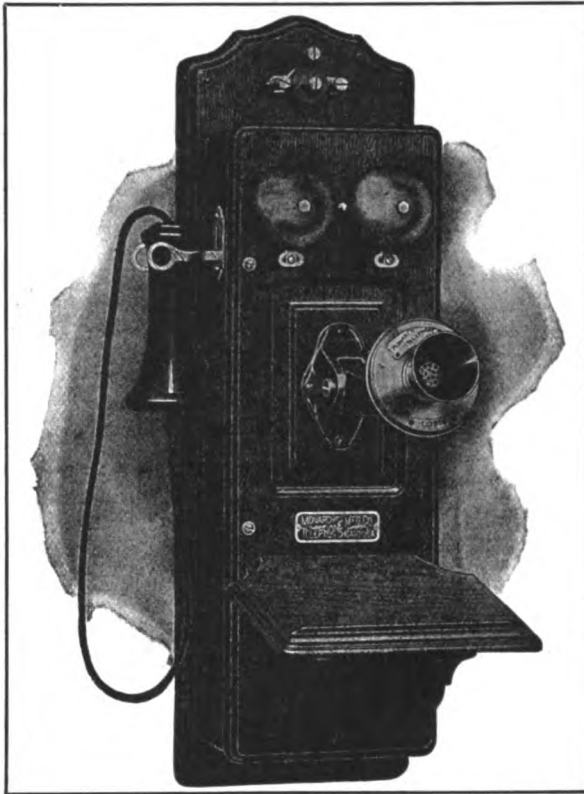
"BULL FROG BRAND."

WE are the originators of the Green and Black Duplex.

We make this of the very best copper wire, insulated with an extra quality of rubber, and each conductor covered with a very closely woven braid saturated with paraffine, one conductor black and the other green. This is the very best wire made for interior telephone wiring.

"One of Our 61 Varieties."

THE F. BISSELL COMPANY
TOLEDO, O.



That all

Monarch Apparatus
is conscientiously made is a well known fact.

That all

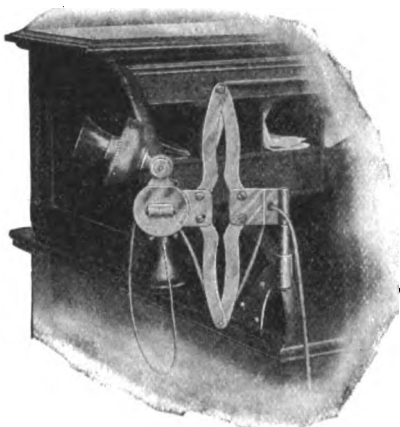
Monarch Apparatus
will give lasting and satisfactory service can
be proven by a trial.

That all

Monarch Apparatus
is reasonable in price considering the quality
can be learned by writing for our prices.

*A full description of Monarch products will be
found in our new catalogue, sent free upon request*

Monarch Telephone
Mfg. Co. 14 SO. CLINTON STREET
CHICAGO, ILL.



No. 1. CLOSED AND SWUNG OUT OF WAY.

SHORT TALKS ON THE

ADJUSTAPHONE

No. 3. Its Economy.

ADJUSTAPHONES cost no more
than the breakable kind, in the
first place,

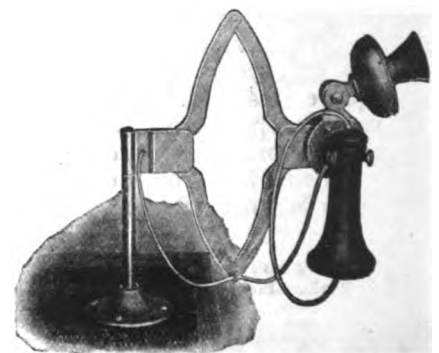
and

ADJUSTAPHONES cost *NOTHING*
to maintain after they are once
in.

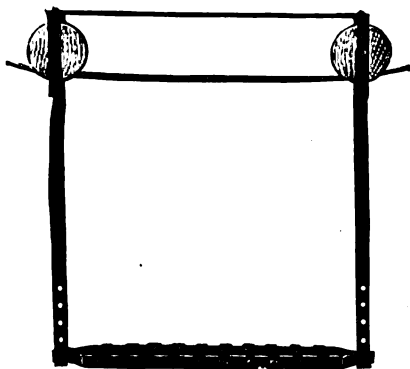
Prices for the asking, and
A FREE TRIAL if you like.

CHICAGO WRITING MACHINE CO.

105 WENDELL STREET, CHICAGO.



No. 5. FOR FLAT TOP DESK.



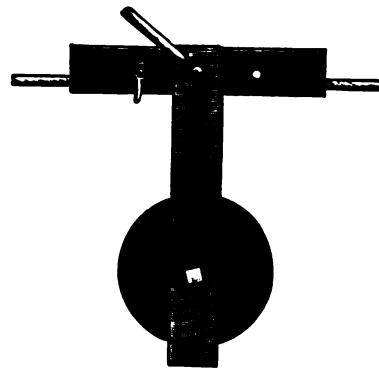
"Ready" Cable Car

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.....	36	Holtzer-Cabot Electric Co.....	7
American Electric Teleph. Co....	40	Imperial Finance & Cons. Co.....	34
Am. School of Correspondence....	2	Indiana Rubber & Insulated Wire	
American Vitriified Conduit Co....	39	Co.	3
Automatic Electric Co.....	37	Index of the Technical Press.....	—
Barr, W. J., Mfg. Co.....	37	Inland Steel Co.....	32
Beidler, Francis & Co.....	33	International Telephone Mfg. Co. 31	
Benedict & Burnham Brass & Cop-		Keelling & Ridge Co.....	34
per Co.	37	Kellogg Switchboard & Supply	
Bissell Co., The F.....	7	Co.	5
Burnley Battery Co.....	33	Klein, Mathias, & Sons.....	34
Butterfield, J. F.....	34	Lanz M., & Sons.....	12
Camp, The H. B. Co.....	39	Leslie, A. C., & Co.....	12
Central Mfg. Co.....	—	Lewis Lumber & Mfg. Co.....	33
Central Telephone & Electric Co....	—	Lindsley Bros. Co.....	32
Century Telephone Const. Co.....	11	McIntire, C., Co.....	36
Chicago, Burlington & Quincy Ry.		Maltby Lumber Co.....	29
Co.	—	Medora Milling Co.....	33
Chicago Insulated Wire Co.....	—	Merritt & Co.....	12
Chicago Telephone Apparatus Ex-		Michigan Cedar Co.....	33
change	34	Middleton, J. W., & Co.....	34
Chicago Writing Machine Co.....	8	Miller Anchor Co.....	30
Churchill, E.....	33	Monarch Telephone Mfg. Co.....	8
Cohn & Beck.....	33	Mullen, Frank	33
Columbia Mfg. Co.....	33	Munk, Otto	9
Connecticut Teleph. & Electric Co.	7	Nagel, W. G., Electric Co.....	9
Cook, Frank B.....	10	National Battery Co.....	9
Couch, S. H., Co.....	31	National Telephone Supply Co....	—
Crumb, W. H., Co.....	36	National Wire Corporation.....	35
De Veau Tel. Mfg. Co.....	7	New Haven Novelty Machine Co..	2
Dickey Clay Mfg. Co., W. S.....	36	Nungesser Electric Battery Co....	35
Eastern Telephone Mfg. Co.....	3	Okonite Company	34
Electric Appliance Co.....	3	Pacific Coast Pole Co.....	30
Elkin Machine Co.....	33	Pendleton & Gilkey.....	33
Ericsson Telephone Co.....	9	Pignolet, L. M.....	32
Erner Hopkins Co.....	34	Pittsburg Lake Superior Iron Co.	29
Fahnestock Transmitter Co.....	2	Prosser & Son, L.....	33
Fowler, John H.....	29	Roebling's, John A., Sons Co.....	32
Garton-Daniels Co.....	11	Sand Point Cedar Co.....	30
Gest, G. M.....	38	Scovill Mfg. Co.....	2
Hemingray Glass Co.....	—	Scribner, A. C.....	11
Hipwell Mfg. Co.....	34	Spargo, James A., Wire Co.....	34

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Is the Best Too Good for You?



If it isn't, then get the

Ericsson Dry Batteries

They last longer, are strong-
er, give better results, and,
considering the quality, are
cheaper than those of other
makes.

Made in three sizes.

Special Price, in
Barrel Lots.

ERICSSON TELEPHONE CO.,

"Independent."

Mrs. of Switchboards, Telephones and Telephone Supplies,

296 Broadway,

Dept. E.

NEW YORK, U. S. A.

STORAGE BATTERIES

UP-TO-DATE **TELEPHONE BATTERIES** MUST HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

SPECIAL ANNOUNCEMENT

March 1st, The Rolfe Electric Company gave formal notice to the American Electric Fuse Company of its election to cancel its contract of license on May 1st, 1904. Public notice is hereby given that the license of the American Electric Fuse Company is revoked and that FRANK B. COOK has an EXCLUSIVE LICENSE to manufacture all inventions of Chas. A. Rolfe and others belonging to the Rolfe Electric Co. relating to protectors and allied apparatus including all forms of

Self Soldering Heat Coils

Having control of over 100 patents (41 under the Rolfe License), I am now better prepared than ever to furnish protective apparatus guaranteed free from patent infringement.

COOK PROTECTORS STANDARD

FRANK B. COOK

Manufacturer of

TELEPHONE PROTECTIVE APPARATUS AND ACCESSORIES

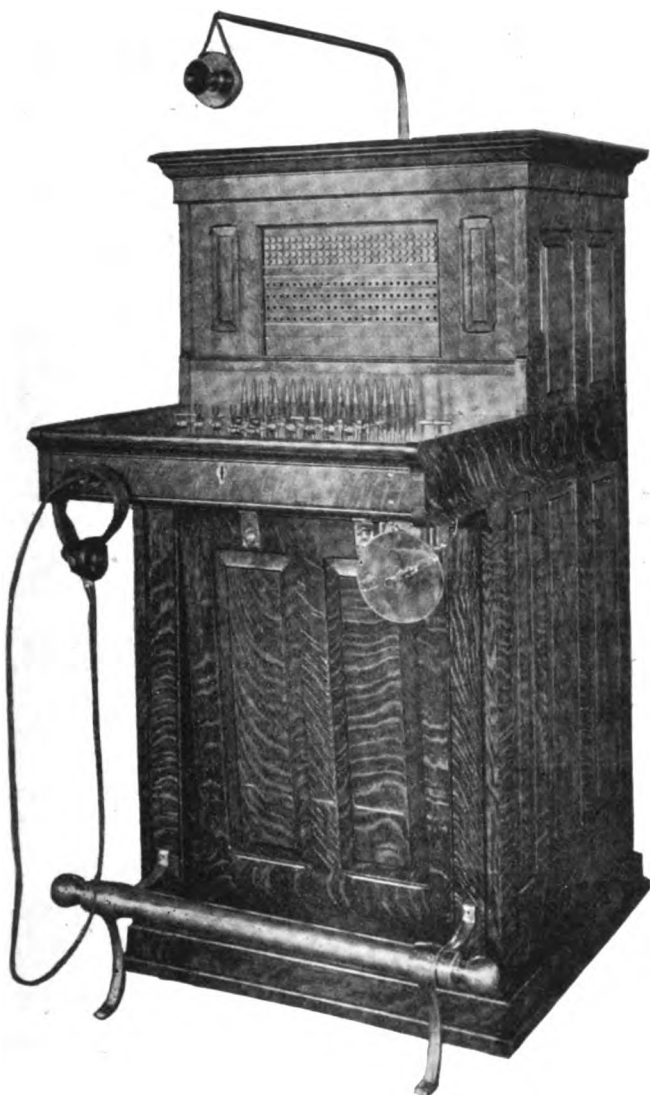
240-244 WEST LAKE STREET, CHICAGO, ILL., U. S. A.

25 YEARS' EXPERIENCE IN TELEPHONE ENGINEERING

We Do Not Infringe

OTHERS' PATENTS

*Our Equipment Covered
by Our Own Patents*



100 LINE LAMP SIGNAL MAGNETO BOARD.

*Common Battery Multiple
Lamp Signal Magneto
Bell Type Tubular Drop
Switchboards for All Services*

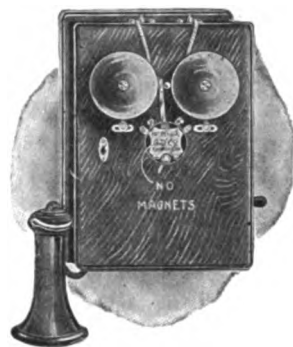
Sterling Electric Co.
LAFAYETTE, IND.

No Magnets

You can't burn it
out if you try

The G. D. DROP

Is not connected with the telephone circuit. The bell clapper works it. It is provided with switch for cutting out extension circuit if desired. Simple. Durable. Cheap. *Pamphlet Do.*



GARTON-DANIELS CO., Keokuk, Iowa

THE CENTURY "Platinum Electrode" Transmitter

Electrode
Surface
Pure
Platinum



FRONT VIEW

Double
Auxiliary
Mica
Diaphragms

Electrodes
Insulated
From
Transmitter
Body



BACK VIEW

Unequalled
for
Quality
of
Transmission

2 VIEWS OF TRANSMITTER CUP

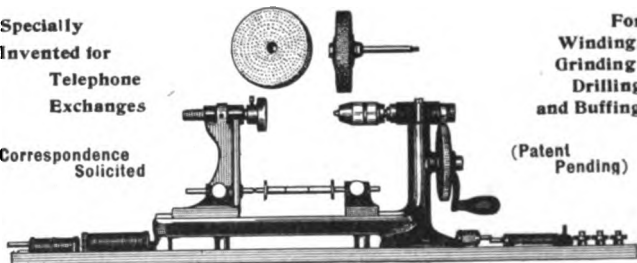
**ALL CENTURY TELEPHONES
Equipped with this Transmitter.**

Century Telephone Construction Co.
536 Ellicott Sq., BUFFALO, N. Y.

THE EUREKA COMBINATION BENCH LATHE

Specially
Invented for
Telephone
Exchanges

Correspondence
Solicited



For
Winding,
Grinding,
Drilling
and Buffing

(Patent
Pending)

A. C. SCRIBNER, MFR.,
GLOVERSVILLE, N. Y.

**DEVELOPMENT AND PROGRESS
STAND FORTH CLEARLY IN**

SWEDISH AMERICAN



APPARATUS

WRITE FOR CATALOGUE

SWEDISH AMERICAN TELEPHONE CO.
CHICAGO.

NEW TRUNKS
ARE NOT AS GOOD AS
EXPANDED
Metal Lockers
FOR YOUR OPERATORS.

*A Safe and Sanitary place to leave wraps.
Increases the efficiency of your Exchange.
In use in hundreds of offices. Also*

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

MERRITT & CO.,
1010 Ridge Ave., **PHILADELPHIA.**



M. LANZ & SONS,
PITTSBURGH,
PA.

**PLAIN
AND
GALVANIZED**

**Telephone and
Telegraph Line Material**

Manufacturers of




MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A. C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA
Chicago Agent, W. J. BURNS, 103 Randolph St., Chicago, Ill.

Telephone Wire



and Cables

BARE COPPER LINE WIRE
Weatherproof and Rubber Insulated Wire and Cables Aerial-Underground-Submarine Lead Covered Cables

TERMINALS-STEEL STRAND-HANGERS

Standard Underground Cable Company,
PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building Chicago.

VOLUME IX

SATURDAY, MAY 7, 1904

NUMBER 19

THE NEW INSTALLATION FOR THE BERLIN TELEPHONE EXCHANGE

AMONG the various European telephone systems none has exceeded in importance or interest that of the Berlin Telephone Company. Formerly this exchange was accredited with possessing the largest grounded line switchboard in the world, but in order to keep pace with telephonic development, the old system has been discarded and recently the company has opened an exchange constructed upon modern principles, embodying some features of design which, while they may appear somewhat foreign and strange to American eyes, nevertheless will be perceived to have certain advantages which may at least be regarded as compensatory. We illustrate herewith, by courtesy of the *Scientific American*, in Figs. 1, 2 and 3, some of the salient features. Fig. 1 shows the main operating room. The switchboard is a multiple one, but it radically differs in general design from the boards in use in this country, because the whole of the multiple is placed horizontally, extending in two long panels throughout the entire length of the operating room and is now equipped for some 14,000 subscribers. The answering jacks, cords, plugs, ringing keys, etc., are placed in a series of ledges which extend horizontally along both sides of the multiple. One is at once reminded of the old arrangement of Law boards, when examining the Berlin exchange. American practice has tended exclusively towards placing the jacks

in vertical panels. In the first place, it is possible to place the multiple jacks in front of twice as many operators because one can sit on each side of a section. Again, owing to this seat arrangement, one operator can help out her companion at the opposite side and obviate the necessity of the operator's rising from her seat in order to reach a distant jack. Contrarywise, however, a horizontal board is much more likely to catch dust and dirt than a vertical one, and experience with the old Law board bears out the opinion that open lines, due to the presence of dust and dirt, are much more likely to occur, but nowadays all telephone plants are built with bridged circuits, and so trouble of this description is becoming almost unknown. In the Berlin exchange a hundred answering jacks and signals are placed before each operator and the switchboard is manned (or perhaps we should say womaned) by 162 young ladies.

With the vertical form of switchboard the multiple cables are run on racks along the rear of the board. With the horizontal type this is manifestly impractical, and to accommodate the cables it has been necessary to build a run-way beneath the switchboard, the interior of which is shown in Fig. 2. From the street the cables are introduced into what is called junction boxes, shown at the bottom of the illustration. The cables go in at either side, leaving a passageway in the center, and from

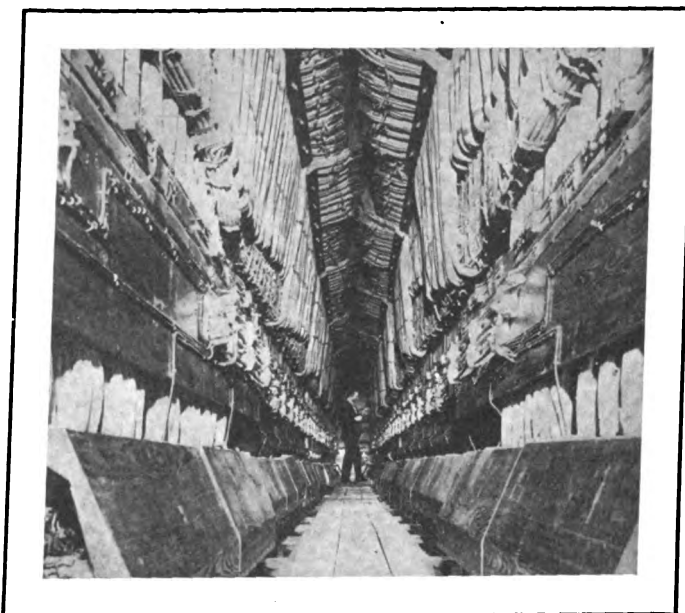


Fig. 2. The Main Operating Room.



Fig. 1. Main Distributing Frame.

the junction boxes are carried upwards and introduced into the jacks at the center of the horizontal panel which holds them. The passageway in the center between the two cable racks is built in order to give access to the cable runs, as is shown in our illustration. The exchange is provided with a distributing board, which is shown in Fig. 3, closely resembling in many of its features those which are common in this country. The photograph shows, on the left-hand side, the line protectors and the general arrangement of the cable. The running of the jumpers in this board differs, however, somewhat from the plan adopted in this country, as most of the jumper running is vertical and not horizontal. From a statistical standpoint this board is reported to contain at this time some 428,500 subscribers' jacks, 11,000 answering jacks, 2,400 ringing and listening keys, cords, plugs and signals. The length of cable employed in the installation is set at 91¾ miles, requiring some 1,500,000 splices. The operating office is worthy of note, as it has been the subject of very careful architectural design. The operating rooms are more than 30 feet in height and are illuminated by overhead skylights, thus always giving the board the benefit of the best lighting. At night a large number of arc lamps are used, which shade in such a manner as to fill the room with a soft, diffused light. To connect the service with other exchanges there are some 2,220 trunk circuits, of which 1,200 are outgoing and the balance incoming. There are special trunk positions allotted for the trunks at the switchboard. The main switchboard is divided into eight different sections, and to

make connection between each section there are some 400 local service trunks.

For night signalling a unique method of attracting the operator's attention has been employed. At either end of each switchboard there is a large incandescent lamp with a ground glass globe, connected in circuit with the signals of the same end of the board. If there is a call the lamp which belongs to the division where it emanated is lighted. At the same time the ringing of the bell attracts the attention of the operator and a pilot lamp indicates the group in which the call has been made.

The system is central energy throughout, lamps being used for both supervisory and line signals. The entire installation was put in by the Siemens-Halske Company, of Berlin, and from the date of commencement of the work until the board was in operation only seventeen weeks elapsed. Besides this exchange there are four others of large capacity, as well as several smaller ones, in the city of Berlin. The average number of calls per subscriber per day is about 15.

A few words in passing as to the securing of telephone operators in Germany. A Civil Service examination is necessary besides a physical one. Notwithstanding this there are always a large number of girls waiting for opportunities. Promotion is necessarily slow and the average salary paid to an operator is less than that in the United States. As the switchboard is a marked departure in general design, the results of its operation will be watched with the greatest interest by those concerned in telephone engineering and operating.

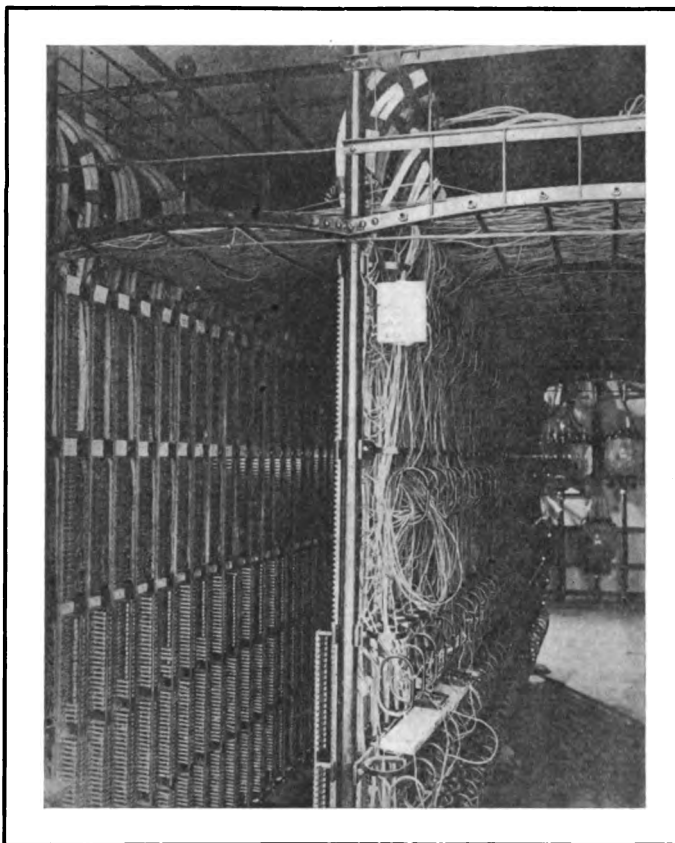


Fig. 3. Runway Beneath Switchboard.

PROGRESS OF LONG DISTANCE TELEPHONY IN TWENTY-FIVE YEARS

IT is a quarter of a century since the beginning of long distance telephony.

Before 1879 no telephone message had been transmitted from one city to another, and the idea that the sound of the human voice could be carried over a wire 40 or 50 miles in length was not generally entertained.

Three years after the invention of Alexander Graham Bell had been exhibited at the Centennial Exposition at Philadelphia and had excited the curiosity of the world, rather as a scientific novelty than a practical utility, the first long distance line was constructed from Boston to Lowell, a distance of twenty-seven miles. When the wire had been strung it was found that the voice of a person speaking in Boston could be heard by the person at the receiver in Lowell. Even then the public failed to grasp the significance of this achievement, and it was regarded largely as an experiment until a business transaction, involving several hundred thousand dollars, was brought to a successful consummation by conferences over the line between the two Massachusetts cities. Papers were drawn at Boston, agreed to by those present, and then read to the parties in Lowell.

Although it was possible to use the Lowell line for business purposes, the apparatus was crude and imperfect in operation. But the beginning had been made on the career of progress in long distance telephony, which is one of the marvels of the mod-

ern industrial world. From the first it was evident that some better conductor must be found than the iron wire then in use, and within six years from the date of the Lowell experiment a hard-drawn copper wire had been made and tested in actual operation, and the ability to converse over long distances, as the term is understood to-day, has been the result of the use of this medium.

The first experimental line in which copper wire was used was that from Boston to New York, completed in 1884, and this was in turn followed by extensions to Philadelphia and other points of commercial importance, so that the cities in the eastern section of the country were soon linked together. Then the lines were pushed westward, and on October 21, 1892, Professor Bell, in the presence of a company of distinguished electricians and officers of telephone companies, spoke into a transmitter in the city of New York, and the message was heard in Chicago. Less than three months later, on the 7th of the following February, the line was formally opened, and during the Columbian Exposition, held in the western city later in the year, there were many occurrences which brought home to the minds of the people the fact that what had been exhibited as a toy at the Centennial Exposition had become a factor of vast importance in the world of affairs.

However conjectural had been the feeling as to the possible

patronage of the long distance lines when they were first projected, it was dispelled at once by the rapidity with which the public availed themselves of the opportunity of making a query and receiving an immediate reply over hundreds of miles of wire. The long distance lines have grown apace, until, in this period of twenty-five years, the total amount of such wire in the Bell telephone system has reached to about 275,000 miles, which in turn connects to local lines of about 3,000,000 miles, all arranged in such a manner that through the various switchboards the circuit can be branched from point to point to reach the desired destination, the longest circuit ever made being that from Boston to

Little Rock, Arkansas, a distance of about 1,950 miles.

While the art of long distance telephony has not yet reached a point where people on the Pacific coast may talk to those on the Atlantic seaboard, and the news of towns on the Great Lakes be transmitted by telephone to the cities on the Gulf, nevertheless 50,000,000 of the 90,000,000 people in the United States are within reach of the telephone, and the close of the next quarter century, 50 years from the date of the opening of that 27-mile line between Boston and Lowell, is likely to see a telephone in every hamlet in the country, perhaps with power to transmit the sound of the human voice from one end of the land to the other.

CONDENSER MAKING

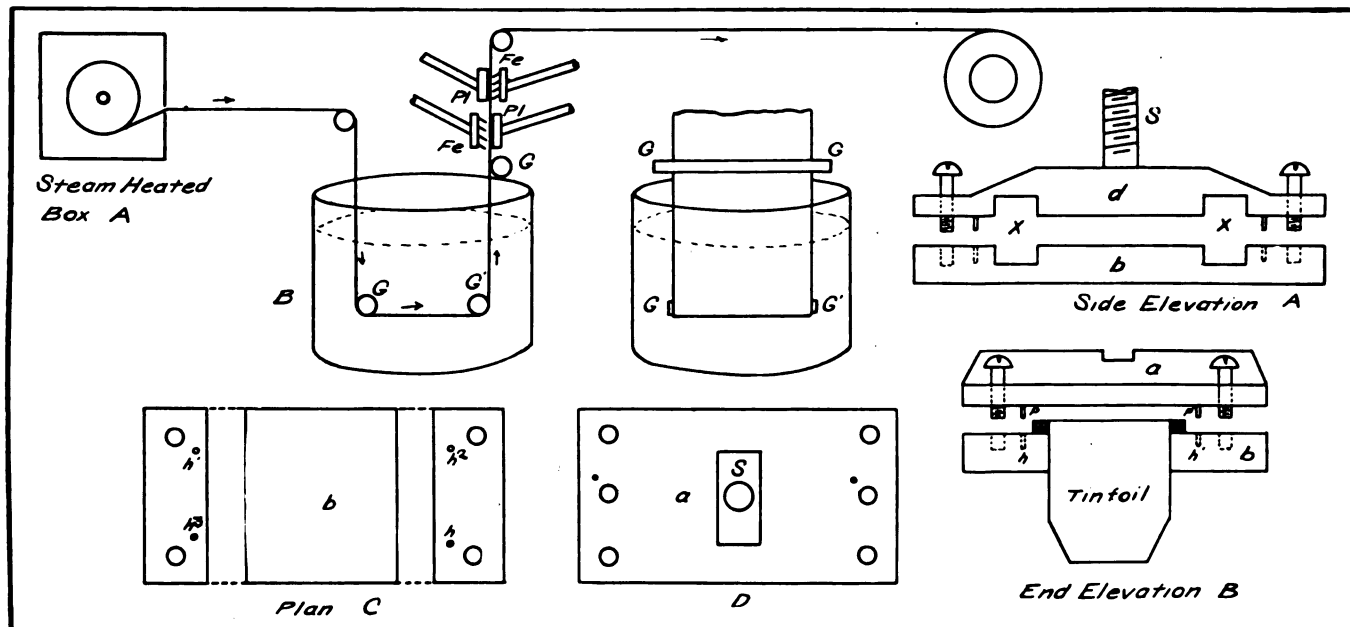
BY FREDERICK A. WEGNER.

THE telephonist of to-day who is supplied by the manufacturer with rolled condensers with the highest degree of efficiency can hardly realize the difficulty which was encountered by earliest makers in the manufacturing of this most valuable telephonic accessory. With improved methods the older makeshifts employed in condenser making have almost been forgotten, and so the following reminiscent account may be interesting:

Most of the paper used in the older days had small black spots in it. These were of high conductivity, being apparently some form of mineral or metal. These spots had to be carefully watched for, because as soon as one of them on a sheet of paper came in contact with the two opposite sides of the condenser a short circuit would ensue and immediately cut down the resistance. The writer can recall an instance where after the condenser measured 50 megohms (50,000,000 ohms) one of the these

in a steam or hot air heated box, shown in the figure, where through a small aperture it entered into the paraffine over a roller and out at the other side, passing between scraping knives, *Fe*, and plates, *Pl*, placed opposite each other. The knives scraped off all superfluous paraffine and the plates presented a smooth and firm surface so the paper would not tear. Knives *Fe* and plates *Pl* were kept heated, this making them work to better advantage. Steam pipes kept *Fe* and *Pl* hot. After the paper passed from between the plates and knives it was rolled on another roller and then placed away, to be used as required.

Iron plates, between which the condensers were built up and compressed, are shown in the figure, at *A*, *B*, *C* and *D*. The top plate, or *d*, is shown with *b* at *A*. The condenser is built up in the bottom one, or *b* plate, after which the top plate was put on, the fibre plates being first with the iron reinforcement plates placed at the proper place, then the set screw *S* is turned down



sheets had gone into the makeup of it, and the resistance was cut down to a little over 2,000 ohms. The condensers were made up with paper which had to be prepared by running it through boiling paraffine in sheets sufficiently large for handling. Upon being taken out of the paraffine one end of it would be cold and thick with paraffine and that end last to leave the paraffine be "nearly all right," that is to a certain extent the paper would be evenly covered with this insulating compound, thin at the far end and thickening gradually towards that end first removed.

Tin foil being difficult of handling in sheets of the old form, thin brass sheets were substituted, and after being built up were placed between fibre plates, on top of each being an iron plate, screwing the machines together with machine screws. Then the condenser was placed in a wooden box, paraffine poured in and covered up. In order to keep the paper at a uniform temperature, dry and free from all moisture, the roll of paper would be placed

and the four thumb plates fastened down (they could be slipped through openings in the upper plate *d*), and the complete condenser was then ready to be slipped into the box that was to hold it and paraffined. A top view of the plate *b* is shown at *C*, where *h*, *h'*, *h''*, *h'''* are guide holes where the guide pins enter, as in a die. At *D* is shown the top plate *a*, with the four thumb screws shown at the four corners, openings *o* and *o'* are those through which the screws are slipped and which held the completed condenser together. In the center of plate *a* is shown the hole into which the set screw *S* was inserted. This kind of a condenser does not answer as satisfactorily as those that are rolled and then pressed flat and inserted into a tin case; neither are they as cheap to make. However, those that are made up in this way stood some severe service and did not break down as often as might have been expected considering the poor quality of paper and other mechanical defects in the construction.

GRAVE CHARGES AGAINST CUMBERLAND BELL

BY W. L. ARNOLD, *Special Correspondent.*

CHANCELLOR ALLISON threw a bomb into the camp of the Cumberland Telephone & Telegraph Company, with headquarters at Nashville, Tenn., by rendering a decision on May 2nd that its charter had been forfeited by entering into a conspiracy in restraint of trade and by illegal discrimination in the matter of rates. The case was brought in 1897 by E. H. Hatcher and other citizens of Columbia, Tenn., who charged that by illegal acts at Columbia and other places set forth in the bill of complaint, the Cumberland Co. had forfeited its charter because of violations of the statutes of Tennessee. This contention was upheld by Chancellor Allison in his decision to-day.

The decision in full follows:

It is sought in this cause to have a decree adjudging that "defendant Telephone Company has forfeited its right any longer to exercise any corporate franchises or power in the State of Tennessee and that defendant company be ousted from the exercise of corporate power and franchise in said State."

"There are several grounds alleged for such decree.

1. "That defendant being a foreign corporation had not filed a copy of its charter in the office of the Secretary of State.

"It appears that defendant did file a duly certified copy of its charter in the Secretary of State's office on the 29th day of April, 1891, and an additional copy on April 11, 1894. The bill in this case was not filed until October 9, 1897. A decree on this ground is denied.

2. "That defendant failed to register an abstract of its charter in each of the counties in the State, in which it is doing business. The Acts of the Legislature on this subject were passed in 1887, 1891 and 1895, the latter of these superseded the others, and the courts have held that since the passage of the Act of 1895, registration of such abstracts is not required.

"Before defendant filed its answer it had, however, registered such abstract in the counties where it is doing business.

"The relief asked on this ground is denied.

3. "That defendant had entered and erected its poles and lines upon the right-of-way of turnpike companies, without permission of the turnpike or condemnation proceedings. The proof fails to sustain this charge, and relief on this ground is denied.

4. "That rates charged by defendant are unreasonable and extortionate. There is no competent proof before the court on this question or subject; relief on this ground is denied.

5. "That defendant, in violation of law, assumed power and authority to lease its plant, or telephone exchange in the City of Columbia to Leland Hume, who was its assistant general manager, and a director in its company. The proof shows, and it is admitted by the defendant, that it did so lease its exchange at Columbia.

"It is also admitted that the Supreme Court, on the application of the State, declared this lease illegal, fraudulent and void and set aside, and that thereupon defendant resumed the control and operation of its exchange at Columbia and has operated it ever since.

"This charge in the bill has therefore been adjudicated by the Supreme Court to be true; the charge that defendant has assumed and exercised power and authority not granted in this respect has been conclusively settled.

"The defense set up to this charge, is that defendant made this lease under the mistaken belief that it had the right and power to enter into such lease.

"The lease contract, the circumstances under which it was made and the proof taken together, satisfies the court, that the lease to Mr. Hume was not made in good faith, by defendant under a mistaken conception of its charter and statutory powers.

"It appears from the proof that a competing telephone company or exchange was organized and put into service at Columbia, and that thereafter defendant reduced its monthly rates at Columbia from \$1.50, \$2.00 and \$3.00 per month to 50 cents per month, being 50 cents less per month than the competing company was charging.

"It appears also that quite a number of citizens in Brownsville, Tenn., (where defendant was operating an exchange), applied to defendant to have telephone service furnished them at the same rate per month that it was furnishing to citizens of Columbia; that defendant refused or would not give these Brownsville citizens service at such rate, and that thereupon, or about this time, the defendant leased its exchange at Columbia to Mr. Hume.

"The defendant did not lease its entire property to a non-competing corporation engaged in the same business, as it had the right to do, but only leased its exchange at Columbia, where it was discriminating in rates against the citizens of Brownsville and other towns and cities in the State.

"All of these facts, established by proof, and circumstances, and the lease contract satisfies the court that this lease was made in violation of law, not by mistake—but for the purpose, if possible, of evading liability under the laws of the State for discriminating in its charge for service; the patent purpose and effort of the defendant being to use one of its directors and assistant general manager in the character of lessee of its exchange at Columbia to

accomplish this end and at the same time and through the same instrument continue its operations, and carry out its purpose, to break down its competitor in Columbia and thereby suppress competition in that city, as it had heretofore suppressed and driven out competition, by similar methods, in Clarksville and Murfreesboro, Tenn.

"In Clarksville and Murfreesboro, as the proofs show, defendant reduced its rates to 50 cents per month for service in each of these cities while the other telephones were in service there, and that this was 50 cents less per month than the others were charging for like service, but that as soon as the defendant had succeeded in breaking down and buying up the other companies by such methods it put its rates up again to \$1.50 and more per month, and then refused to carry out some contracts it had previously made to furnish service at 50 cents per month.

"In connection with, and as part of, this latter charge in the bill, it is alleged that the defendant has thus suppressed competition in the cities of Clarksville and Murfreesboro, and is engaged in an effort to suppress competition at and in Columbia by the employment of unlawful and forbidden methods.

"This course in the business methods of defendant in suppressing competition by breaking down and buying out competitors is sought to be justified by the defendant under sections 2043, 2046 and 2202 of Shannon's Code. Section 2043 empowers corporations in Tennessee to lease their property and franchises in Tennessee to any other corporation engaged in the same business in this or any other State but section 2046 says that section 2043 shall not apply to competing railroads; section 2202 authorizes telephone companies to consolidate.

"As to section 2202, it is sufficient to say that there was no consolidation of the two telephone exchanges, or companies, at Clarksville and Murfreesboro with defendant, the defendant simply broke down the business, and business prospects of these two companies, or exchanges, and then bought their tangible property at prices virtually fixed by itself, and went on operating its own exchanges, and put rates for service up to prices formerly charged.

"It is insisted by defendant that section 2043 gives it power to acquire or buy out competing 'exchanges' or telephone companies, that it had the right under this section to acquire the other two companies at Murfreesboro and Clarksville in the manner it did, for the reason that section 2046 only forbids a railroad from leasing and taking over a competing line; that telephone companies not being named along with railroads as forbidden to lease a competing exchange or telephone, that telephone companies are, therefore, exempt or excluded from the provision and policy of this section, and further that the methods used and employed by defendant at Clarksville and Murfreesboro, which enabled it to buy out and to take over the two competing companies or exchanges in those two cities, was nothing more than the consolidation contemplated and allowed under section 2202.

"The court holds that section 2043 only authorizes one corporation to lease and not to buy outright, the property and franchises of another corporation engaged in similar or the 'same business,' and that under this section such corporation, if it be a telephone company, can neither buy nor lease a competing exchange or company.

"The court further holds that section 2202 did not authorize the defendant to acquire the property of the two other companies at Clarksville and Murfreesboro in the manner and by the methods employed. A corporation takes and exercises powers by specific grant and never by implication.

"The court holds further that the provisions, principles and policy of the whole of section 2046 applies to telephone companies and therefore forbids the acquisition by one telephone company of another such competing company or exchange in the manner and by the methods employed by the defendant to acquire the one at Clarksville and the other at Murfreesboro with their franchises and property.

"A telephone company must occupy and sustain the same relation to the State, the citizens thereof, and to commerce and business generally, in the exercise of its franchise rights and powers and the discharge of its duties, that railroads and telegraph companies do.

"If this be true, they are quasi-public common carriers (of messages) and therefore amenable, or subject, to, and controlled by, the whole statutory law of the State applicable to railroad and telegraph companies, and cannot, therefore, claim and exercise powers and rights which are denied under the statutes to railroads.

"The court holds that defendant has assumed to exercise powers and authority not conferred upon it by the laws of the State of Tennessee, and has forfeited its right to exercise any corporate franchise or power in the State of Tennessee, and that defendant be ousted from the further exercise of any such power or franchise in the State, and that its business be closed and wound up.

The Cumberland officials decline to say anything in regard to the Chancellor's decision. An appeal was taken to the State Supreme Court, and this acts as a stay of the judgment of ouster. No legal decision in Tennessee in many years has caused the sensation that this one has.

THE VOLTMETER AS USED FOR TESTING

By F. C. GREENWALD.

IN many telephone exchanges otherwise up-to-date a series magneto is still used for testing lines. Results from this method are very apt to be deceiving, although many magneto men have become exceedingly adept in determining trouble by this method. A frequent instance where such deception is probable is when one rings out on a long cable line to ground. In this case the capacity of the cable will indicate a ground while the conductors may be entirely clear. It is important to know to what extent a line is shunted or grounded so as to send the

good tests. In this case the scale should read from zero to 15 volts, sufficient dry cells being used in series to produce the required potential. With the keys in normal position the voltmeter will take a reading between the pair of wires to be tested, throwing key No. 1, the voltmeter will read out one of the wires and through a possible ground back to the exchange, completing the circuit. And by throwing the cam of the reverse key No. 2 the condition of the other wire is noted. This arrangement of keys is well adapted for use in small exchanges, either central energy

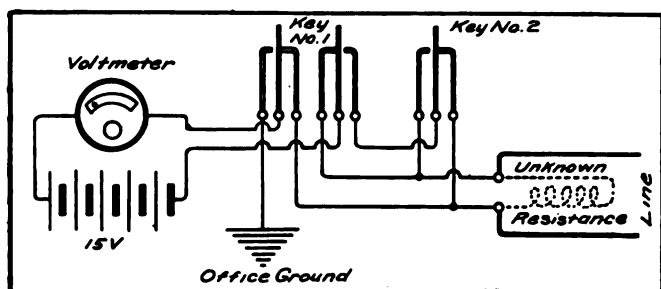


Fig. 1. Simple Arrangement of Test Keys.

right man to clear the trouble, since there are both inside and outside troubles which, with the bell test, appear the same. The proper method to test out lines is by means of a voltmeter. When one becomes familiar with the different deflections of the pointer of the instrument it is easily known what trouble to expect and where to locate it.

For instance, on a line in a central energy system a steady deflection less than that produced by a dead shunt is noted. Such a deflection is usual when the condenser at the sub-station is

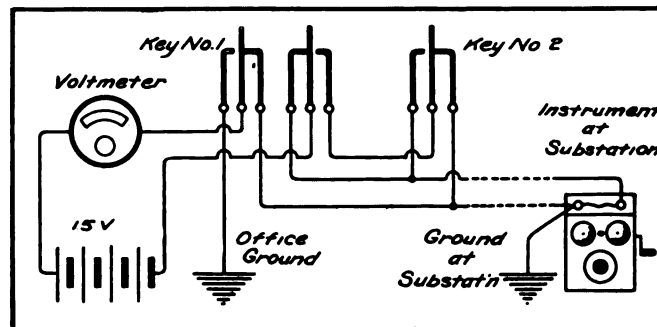


Fig. 2. To Test for Balanced Lines.

or local battery. A complete series magneto telephone may be used in connection with the test to allow the adjustment of the bell at the sub-station. This circuit arrangement will show the extent of grounds or shunts in a cable, or on a line, or at a subscriber's station; and give some idea as to cause and cure of the trouble. It also tends to show the mysterious cause of local lines being quiet when connected to local circuits but becoming noisy when connected to a long distance line which is itself quiet. The voltmeter will show the small ground on one or both sides

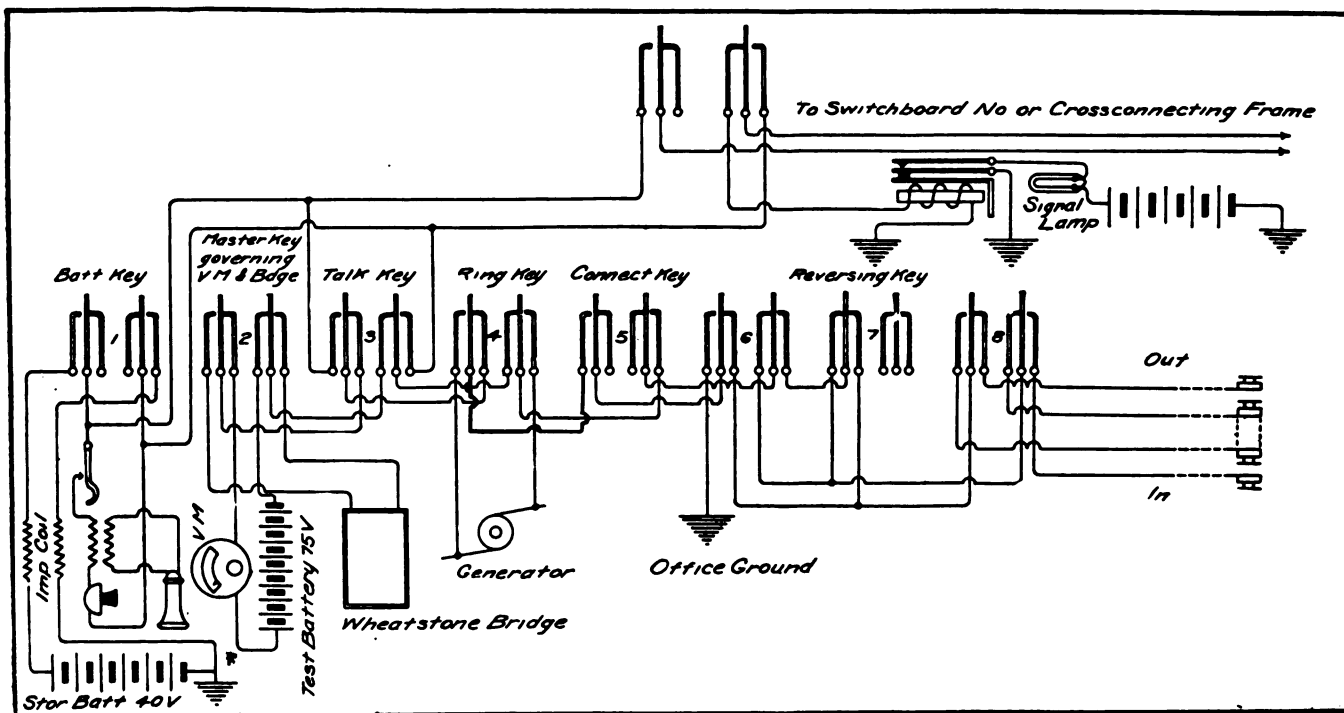


Fig. 3. Wire Chief's Test Set at Harrisburg, Pa.

shunted, allowing current to pass through the ringer coils. Again, a permanent signal may show up which is found, by testing, to indicate a receiver off the hook and the inspector would be notified accordingly. These are but simple examples of the troubles which can be determined with the aid of the voltmeter. The cost of this instrument is not high when the results to be derived with its use are considered. A very reliable two-scale voltmeter can be purchased for about \$35, and there are instruments of the single scale type which sell for even less. Fig. 1 shows a simple arrangement of battery voltmeter and keys which will allow of

of the line which may be the possible cause of trouble. Loose connections may also be indicated by the needle continuously moving from 10 to 13 volts on the scale.

A swinging cross will be shown by needle swinging say every half minute or so from 9 to possibly 15 volts. If we wish to watch the line for 5 minutes or so it would be impossible to ring all that time without annoying the subscriber or tiring our arms; whereas the voltmeter will watch the line more accurately and without any effort on our part. In a case of damp inside wiring or telephone cords, or moisture in a cable, the voltmeter needle

will perhaps go to 10 volts and gradually drop back to 7, then 5, and rest finally at about 2 volts. What could a generator do with this test? The voltmeter can be used to roughly determine whether or not a line is in balance, whether a line contains as much ohmic resistance in one wire as in the other. The method is as follows:

Clear the line of all shunts or grounds, short circuit it at the distant end, and grounding it with a piece of wire at the arrester or elsewhere. Test on both wires to ground. If the two deflections obtained are equal the line is in balance as far as resistance is concerned. If they are not equal look for bad joints in one or both sides of the line. This test is shown in Fig. 2.

The voltmeter, in absence of a Wheatstone bridge, might be used to roughly measure resistance of a coil, a drop, or a subscriber's line. In this case it would be necessary to know the resistance, in ohms, of the voltmeter. This is usually written on the instrument box by the makers. It is also necessary to know the voltage of the test battery. This is found by short-circuiting the wires of the test leads attached to the line to be measured. This would give the full deflection, which is the strength, in volts, of the battery. After attaching the coil or other article to be measured, we proceed exactly as if we were measuring the two wires of a subscriber's line, noting the deflection, in volts, obtained. Take, for example, the resistance of a voltmeter is 5,000 ohms, the potential of the battery is 15 volts, and deflection obtained with unknown resistance in series is 12 volts. We would then have

$$\text{Resistance of v. m.} = \left(\frac{\text{voltage of battery}}{\text{voltage of battery in series with unknown resistance}} - 1 \right) = \frac{15}{12} - 1 = \frac{5,000 \times 3}{12} = 1,250$$

Our result is 1,250 ohms, a resistance near to that of an ordinary high wound bridging drop. By noting the deflection in subdivisions of the volt on the scale a closer approximation to the actual resistance can be obtained. Various other tests will be suggested with this arrangement of battery and voltmeter in se-

ries, such as going over cable heads in a magneto exchange after a thunder-storm to detect lines having grounded carbons, etc.

In large exchanges it is usual to arrange a combination of this circuit with a test telephone, power generator, and sometimes a Wheatstone bridge, on a special desk or testing table. Figure 3 gives circuits, etc., of the wire chief's testing table at Harrisburg, Pennsylvania.

Referring to the figure the following points are in evidence: The wire chief may test with the voltmeter or measure with the Wheatstone bridge, ring, or talk out over a line metallic, or either side to ground. By using a 4 point plug inserted in the place occupied by the heat coils on the terminal head tests can be made both out on the line as well as through the exchange.

The telephone may be used independent of test circuits as an ordinary instrument. The generator has an 80 ohm ringer in series with it so as to obtain the same results as when testing with a magneto. Cords are replaced with keys of which there are nine. The operation of the set is as follows:

After inserting the test plug between heat coil springs on the cable terminal the 5th key is thrown. This puts the voltmeter and test battery across the line. To test one side to ground, No. 6 key is thrown, and by throwing No. 7 key the other side is tested. To listen on the line No. 3 key is thrown. This cuts out the voltmeter, and if you wish to talk throw No. 1 key, which supplies both wire chief's telephone and subscriber's telephone with battery. Ringing is done with No. 4 key. Key No. 2 places the Wheatstone bridge in circuit instead of the voltmeter and battery, and by using the key No. 8 the wire chief can talk, ring or test back towards the exchange.

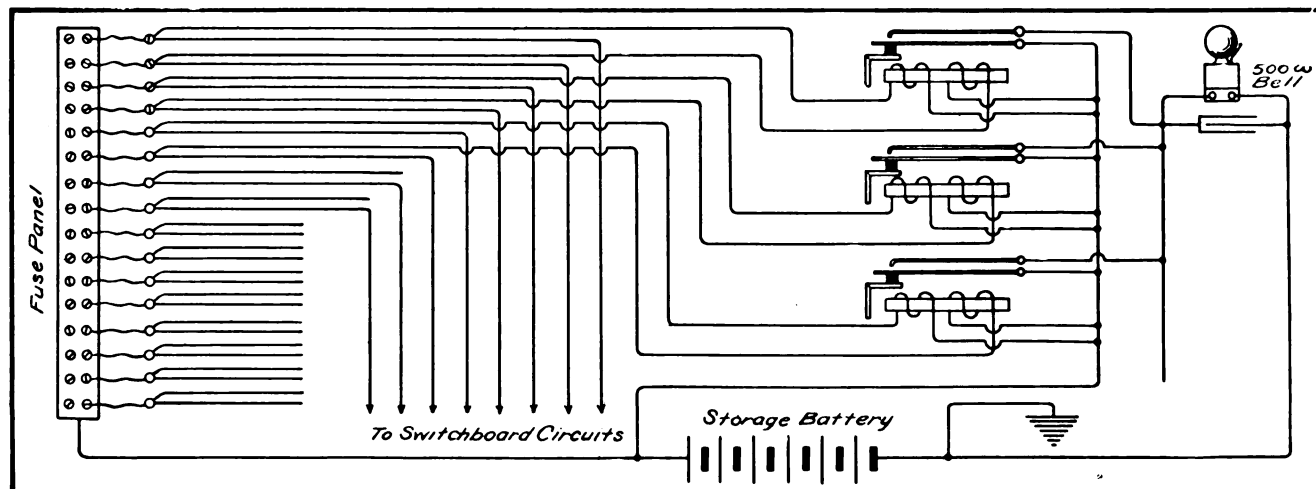
The test telephone may be used as a regular instrument by throwing the key at the top of the figure. This places his telephone circuit across a line running to the switchboard, and the operator receives his signal in a similar manner to that of a subscriber. Should an operator wish to signal the wire chief, she may do so by inserting a plug in the jack corresponding to this telephone number. In doing this she puts positive battery on the sleeve of the jack, which connects with a relay that controls a local lamp circuit on the testing table. When the wire chief answers by throwing the corresponding key the relay circuit is opened, putting out the lamp. It is not necessary to use key No. 1 in talking through the switchboard.

AUTOMATIC FUSE ALARM

BY C. S. BUNDESMAN.

ALL common battery exchange circuits are protected by fuses but few are equipped with fuse alarms. Many of these circuits are of vital importance, and the opening of one of them if not discovered at once may cause considerable trouble.

one relay is sufficient for two circuits) and a vibrating bell of 500 ohms resistance. The operation is as follows: By referring to the figure it will be seen that when the fuse is in position the corresponding relay is shunted out. When a fuse fails the shunt cir-



As a means of immediate notification of the failure of a fuse I have found the circuit hereafter described to prove entirely satisfactory. The necessary apparatus to install the alarm depends on the number of circuits to be protected (differential relays preferred because of reduction in wiring and space since

circuit embracing the relay becomes operative, closing the bell circuit and giving the alarm, which will continue to signal till the defective fuse is replaced. In exchanges where the number of subscribers does not warrant the expense of a night wire chief, the chief operator could be instructed as to the working of the alarm.

A SIMPLE TELEPHONE ACCOUNTING SYSTEM

By EDWIN D. SCHADE.

FIG. 1 represents a page of a subscriber's ledger used by the Johnstown Telephone Company of Johnstown, Pa. For ready reference the pages are indexed with heavy index letters from A to Z, and under each letter is a sufficient number of

in the odd numbered spaces. The card record of subscribers' contracts is self-explanatory. On the reverse side may be kept a record of toll slips mailed to subscriber, showing date, amount and date paid. Fig. 3 represents a collector's receipt to a sub-

[illegible]

Fig. 1. Left Hand Page of Subscriber's Ledger.

pages to allow for all subscribers whose names begin with that letter. The contract number of each subscriber is also entered, which corresponds to a card record of the subscriber's contract.

scriber for amount paid, with duplicate numbered stubs. In the margin shown at *A*, a summary of the day's collections is entered and totals are transferred to daily cash book. The amounts

[illegible]

Fig. 1. Right Hand Page of Subscriber's Ledger.

(see Fig. 2) which is permanent. The totals are entered at the foot of each page, and each page is self-balancing. The "Balance Due" plus the "Rent for Quarter" must equal "Total Amount Due."

collected are credited direct from the collector's stub into subscriber's ledger, it not being necessary to make any other entry of subscriber's name or amount paid. By this system, one man

[illegible]

CONTRACT NO <u>1257</u>	JOHNSTOWN TELEPHONE CO	ORDER NO <u>2173</u>
IN EFFECT <u>Jan 1 1963</u>		
SUBSCRIBER <u>J. J. Smith</u>		
LOCATION <u>424 Lincoln Ave</u>		
COLLECT AT <u>LL</u>		

RESIDENCE PHONES	BUSINESS PHONES
PRIVATE WALL @ <u>\$</u>	PRIVATE WALL @ <u>\$ 3.30</u>
PRIVATE DESK @	PRIVATE DESK @
PARTY WALL @	PARTY WALL @
PARTY DESK @	PARTY DESK @
EXTENSION PHONES @	EXTENSION PHONES @ <u>12</u>
EXTENSION BELLS @	EXTENSION BELLS @
TOTAL \$	TOTAL FOR BUSINESS \$
REMARKS	TOTAL FOR RESIDENCE \$
	TOTAL ANNUAL RENTAL \$ <u>4.2</u>

Fig. 2. Contract and Toll Record.

and the "Amounts Paid" plus "Balance Due" must equal "Total Amount Due."

who acts as bookkeeper, cashier and collector, handled the accounts of over 1,600 individual contracts, very few of which were paid at the office.

Each ledger is designed for one year's business, and when the

NO. <u>3900</u> <u>THE JOHNSTOWN TELEPHONE CO.</u> JOHNSTOWN, PA. <u>Jan 6</u> 190 <u>4</u> RECEIVED FROM <u>J. E. Smith</u> FOR RENT OF TELEPHONE TO <u>Apr 1</u> 190 <u>4</u> \$ <u>10.50</u> FOR TOLL MESSAGES TO <u>Jan 1</u> 190 <u>4</u> \$ <u>3.70</u> FOR <u>Moving telephone</u> <u>2.40</u> TOTAL \$ <u>15.60</u> JOHNSTOWN TELEPHONE CO. PER <u>J. E. Wilson</u>	NO. <u>3900</u> <u>THE JOHNSTOWN TELEPHONE CO.</u> JOHNSTOWN, PA. <u>Jan 6</u> 190 <u>4</u> RECEIVED FROM <u>J. E. Smith</u> FOR RENT OF TELEPHONE TO <u>Apr 1</u> 190 <u>4</u> \$ <u>10.50</u> FOR TOLL MESSAGES TO <u>Jan 1</u> 190 <u>4</u> \$ <u>3.70</u> FOR <u>Moving telephone</u> <u>2.40</u> TOTAL \$ <u>15.60</u> JOHNSTOWN TELEPHONE CO. PER <u>J. E. Wilson</u>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Fig. 3. Collector's Receipt.

names are transcribed into the next new ledger, they are entered in the even numbered spaces, which permits the entering of the names of subsequent new subscribers in regular alphabetical order

Some may object to transcribing the names to a new ledger annually, but by doing so, all dead accounts are eliminated once a year.



BUSINESS INTERESTS VERSUS SENTIMENT.

THE absolute commercial necessity of an Independent telephone system was recently demonstrated in Michigan. One of the banks in Pontiac called up a firm in Detroit in order to place a large order for awnings. The message went over an Independent wire, that of the Co-operative Telephone Company. This is a small company with a very limited switchboard and comparatively few subscribers. The company is connected with all of the Independent lines of the State and when a Detroit man is called for, sends a messenger for him.

The result in this case was peculiar. The man called for was not a Co-operative subscriber and when notified that some one from Pontiac wished to talk to him over an Independent wire he refused to go into the adjoining store for that purpose. He sent word that if the Pontiac party wished to talk to him he must talk over the Michigan company's wires.

The effect of such a message on the customer can be imagined. He fairly snorted with rage and the burning words which he addressed to no one in particular nearly put the telephone out of business. Then he got into connection with some other firm which handled the goods he wanted and placed a large order.

In this instance the city of Detroit was not the loser, for the goods were still purchased there, although of another firm. But this Pontiac man was not to be coerced. He meant business and swore that rather than use the wires of the Michigan company he would place his order in Grand Rapids, and in that case the loss to Detroit would have been absolute.

This is not an isolated case. Similar incidents happen every day, for the Co-operative company only charges about half as much for service between Detroit and Pontiac as the Bell company and business men are not slow to take advantage of it. For this and other reasons there is a great deal of feeling around the State against the Bell company and the feeling is growing instead of being alleviated.

It would be interesting to know what the city of Detroit has lost in the way of trade by not being able to properly reach the thousands of business men, scattered over the State, who use Independent wires. Of course there is no way of getting at the exact figures, but that they are enormous can not be doubted. And Detroit is only one city. Independent telephone systems have multiplied rapidly throughout the country, but there are certain commercial centers like Cincinnati, Denver, Washington, New Orleans, San Francisco and New York which still lack connection with the millions of users of Independent telephones.

For instance, at the present time it is impossible to reach Chicago, one of the greatest business centers in the country, over an Independent line. This will not be true long, because the Interstate Telephone and Telegraph Company is making arrangements to connect with the new automatic system in Chicago. But the illustration holds good at the present moment.

Whose loss is this which arises from such a state of affairs? Within a radius of two hundred miles of the metropolis with its immense business interests are a half million Independent telephones in operation and not a single one of them can get con-

AN INDICATION WHY DELAY IS DANGEROUS.

nection with this important center. Whose is the loss? These half million people are inconvenienced, it is true. But this monopolistic state of affairs is costing the business men of Chicago

every year millions of dollars in excessive rentals and losses of trade.

The business interests of Chicago need the Independent telephone connections and an Independent outlet into this great commercial territory more than the subscribers of the Independent companies need Chicago and her business interests. What is true of Chicago is even more true of these other cities.

Business Chicago sees this. The business men in the loop district, to which the automatic telephone system is largely confined, have looked out and seen prosperous Independent systems reaching through the State, west into Iowa and Missouri and beyond, north into Wisconsin and Minnesota, south into Kentucky, east into Michigan, Indiana and on to the Hudson river, and they have demanded connection with this rich territory.

Just as long as these other large centers delay in this important matter, just so long will the business men continue to lose millions and just so long will the people be inconvenienced by this short-sighted policy.

It is not possible that such a state of affairs can long continue. There is a deep and underlying reason for this remarkable growth of Independent telephony. We call it marvelous, but it is really the most natural thing in the world. It was inevitable that there should be a reaction from the exasperating and expensive Bell monopoly. Certain telephone systems may be established because of angry revolt from Bell domination, but sentiment will never keep a telephone company in operation and its stock paying dividends. There must be some economic basis for growth and prosperity. Independent telephony has prospered because it was needed and will continue to prosper as long as it is needed and no longer.

Detroit and Washington and New York and these other cities will get into connection with the millions of Independent telephones, not because of any sentiment, but because they must. They can not afford not to. It sometimes takes patience to wait, but the inevitable can only be postponed. The minute the business men of these cities realize that they are losing money and business because they cannot reach the Independents, the victory will be won. They will have an Independent system then if they have to put it in themselves.

When an Independent company is canvassing a town these days it does not pay much attention to the business men, if there is any thing like hostility among them. The company connects with the residences and the outlying districts, until in a short time the business men find that they need the Independent more than the Independent needs them. This educating process is now taking place on a much larger scale in some of the great commercial centers with reference to the smaller towns. It is only a question of time when the business interests will see the light. Meanwhile, however, they are losing millions of dollars unnecessarily.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

UNREASONABLE LOCATION OF POLES.

THE ordinance adopted by the borough council of Sunbury, Pa., giving the Bell Telephone Company the right of way to construct a line of poles and wires through the streets and alleys does not give the company the additional power to place a pole in front of any property when the same interferes with the rights of the owner.

This is the decision of the District Court of the County in the case of Bartholomew against the company. The complainant sued for an injunction restraining the company from planting a pole at a place where, she alleged, it would do her property irreparable injury. The plaintiff claims that if a pole were planted at the point intended, access to her property for purposes for which it has been used heretofore, and for which she further intends to use it, would be rendered impossible with wagons and teams. The court said, in its opinion, that it felt convinced that if the location of a pole at the point intended would not render access absolutely impossible, it would make it excessively inconvenient as well as highly dangerous. The defendant company, however, under an ordinance of the borough of Sunbury, had the right to erect and maintain its lines of poles and wires, and the court had no disposition to interfere with the construction thereof, provided in so doing it does not work irreparable injury or impose undue and unnecessary burden upon private property.

Continuing, the court said: "The Street Committee, under the ordinance, are invested with wide discretion, but their powers are not broad enough to authorize them to locate poles without any regard for the rights of private property. While they may not be obliged to consult the owner of real estate before designating a location, yet, if in the exercise of their office they, even unintentionally, work irreparable injury or impose burdens and conditions which are wholly unnecessary and thus exceed or abuse their discretion, their acts may be supervised by a court of equity. In this case, in view of the injury that the location proposed by it would inflict upon the plaintiff and in view of the fact that another and less injurious site in front of the plaintiff's property might have been adopted, we think the committee went beyond the reasonable discretion given them by the ordinance; especially when it is remembered that the point intended was known to them to be objectionable to the plaintiff."

An injunction was accordingly issued.

CITY'S RIGHT TO FIX RATES.

THE Supreme Court of Missouri, in an opinion by Judge Valliant, and concurred in by a majority of the court, has held that Kansas City had no right to pass an ordinance fixing the maximum rates to be charged for telephone service in that city. The court holds that the State of Missouri has the authority to fix charges of telephone corporations for their service, but that the State has not delegated this authority to the cities in their charters, and that Kansas City exceeded its authority in passing an ordinance reducing telephone rates in that city.

The proceeding was an original one in the Supreme Court, being an application for a writ of mandamus by James Garner to compel the Missouri and Kansas Telephone Company to place a telephone in his office at the reduced rates specified in an ordinance passed by the city council. The rates charged by the company were \$96 for business houses and \$72 for residences, and the rental fixed by the council was \$52 for business houses and \$35 for residences. The report of the special commissioner, who determined the facts in the case, showed that the telephone company was making 26½ per cent. profit annually.

The telephone company refused to place a telephone at the re-

duced rates, and the proceeding was brought to test the right of the city under its charter to fix a maximum charge. The application for a peremptory writ of mandamus was argued in the Supreme Court last fall.

In support of the ordinance it was contended that the city had the authority under the general welfare clause of its charter to regulate telephone and telegraph charges within the limits of the city; that telephone companies by their charters have the right to fix reasonable rates; what is a reasonable rate is undoubtedly left to the city by virtue of the police power. It was also argued that there was no intervention of congress to regulate interstate commerce because telephone companies are, with respect to service, within the city, local concerns, and that the service asked for by this proceeding is deemed only within the city limits.

The attorneys for the company dealt mainly with the constitutional guarantee which the company, when it was chartered, received from the State, and also pointed out the great difference of cost in construction of plants and rendering of service in different sections of the country. They contended that a city has no power to regulate rates of public service corporations within its limits because such corporations derive their authority and owe their origin to the State. Certainly the State cannot create a corporation and then allow a city which is also a creature of the State to pass ordinances to regulate its business.

The court held, in denying the writ, that the city had the right to compel the telephone company to place its wires underground or its poles along certain streets, but after granting the franchise at a certain rate, that it then remained with the State, through the General Assembly, to cut down the rate to be charged for service.

Garner vs. Missouri & Kansas Telephone Co.—*Pacific Reporter*.

KANSAS STATE BOARD OF TELEPHONE ASSESSORS MAKES A DECISION.

THE State board of telephone assessors of Kansas has decided to assess only such telephone companies as have property interests in more than one county. The law provides that telephone companies confined in their operations to the limits of a single county shall not be assessed by the board. The attorney-general, in a recent decision, held that if a local company transacted business over connecting lines extending into other counties it was technically assessable by the State board. Acting under the authority of this decision, the State auditor sent out blanks to many telephone companies that had not been assessed by the State board heretofore. The board decided, however, to pursue a liberal policy and allow companies having their property confined to the limits of a single county to be assessed by the local assessors.

COUNCIL HAS RIGHT TO ESTABLISH CONDITION PRECEDENT.

AT Fremont, Neb., Judge Hollenbeck has given a decision in the District Court dissolving the injunction secured by the Fremont Telephone Company against the City of Fremont. The court filed a written opinion holding that the council had a right to establish a condition precedent with which the company must comply before putting in its plant, and that when it put in its plant it accepted the terms made by the council. The judge did not pass upon the question whether the council had an absolute right to fix telephone rates. He also held that the action of the council granting the charter to the company was legal and within the full scope of its jurisdiction. The decision practically sustains the contention of the city on nearly all the points.



IN THE OPERATING FIELD.

INDIANA STATE CONVENTION.

THE annual meeting of the Indiana Independent Mutual Telephone Association will be held in the city of Lafayette, Indiana, June 28th and 29th. If precedent can be depended upon this will be the largest State meeting held by any association and will be of interest and benefit to both the operating companies, manufacturers and supply people attending. There will be able papers prepared and discussions upon topics of vital interest to all Independent telephone people. The leading manufacturers and supply men will make creditable displays of all lines of goods.

The headquarters will be at the Hotel Lahr. There will be a program of entertainment, such as trolley rides, vaudeville shows, music, an inspection of the electrical and mechanical department of Purdue University, banquet and a dance, all of which will be free to the members attending the telephone association.

The Sterling Electric Company is sending out its usual open-handed welcome in which it says: "As it has been three years since we have had the pleasure of meeting our telephone associates at our home, we are pleased to announce that the Indiana State Convention has been called to meet at Lafayette, Indiana, June 28th and 29th. We wish to extend to you an invitation and assure you of a hearty welcome, in addition to the invitation extended by the Association. It is the intention to have a meeting of representative telephone men, regardless of their membership in the association. We want to see every company in the Independent telephone business in the State of Indiana represented at this meeting, and believe it will be to their interest to be represented. Come, whether you are a member of the association or not. There will be no charges for any entertainment. There will be no assessments, but a 'getting together' of all Indiana telephone men for the purpose of holding a harmonious meeting for the advancement of Independent telephone interests. We will accord you a hearty welcome and urgently request that every company in the State of Indiana be represented. Rest assured that we will use every effort to make the stay in our city both profitable and pleasant. Kindly notify your neighboring companies of this meeting and time, and request that they be present; we might inadvertently overlook them. We sincerely hope that all Independent telephone men will attend. We appeal to you to come and help make the Independent telephone movement in the State of Indiana the strongest and most united of any State in the Union."

SIMULTANEOUS TELEPHONY AND TELEGRAPHY.

IN a recent issue of the *Electricista* there is a report of some tests made at Ferrara by Professors Battellia and Rigi upon the Turchi-Brunè system of composite telegraphy from which the operation of the apparatus appears to have been so reliable as to remove all question as to the practicability of this method. Through the kindness of Bologna's telegraph inspector all those witnessing the experiments were allowed to test the apparatus in every conceivable manner of which they could think, and in all cases the apparatus responded successfully, transmitting simultaneous telegraphic and telephonic messages without the slightest confusion. It had been asserted that with other systems difficulty had been experienced when telegraphic currents of high frequency were transmitted, and that therefore such systems were unqualified for the Wheatstone telegraph and other automatic

senders. With the experience here related particular pains were taken to test out this point. A Wheatstone telegraph sender was arranged to be operated with the highest possible speed of which the instrument was capable and messages were sent over the line synchronously with telegraphic conversation without the slightest interference.

TELEPHONE COMPANIES AND POLICE AS ALLIES.

NOTICES have been served on President Wheeler, of the Chicago Telephone Company, to the effect that applications would be made before Judge Dunne for injunctions restraining the company from removing the telephones at 823 Larabee street and 94 Van Buren street. This is the first sign of an approaching legal battle which President Wheeler has been anticipating ever since his company became the ally of the police department in the war against handbook gambling.

It is the claim of the police that both telephones are used for disseminating race track information, and President Wheeler counted on Assistant Chief of Police Schuettler to produce proper proof of the fact in court. It is understood that an agreement on the part of the Police Department to render the telephone company this kind of aid was reached before the fight was opened on the handbook gamblers.

MUNICIPAL TELEPHONY IN GREAT BRITAIN.

By A. DARLINGTON.

WE are accustomed to consider that we lead the world in most mechanical avocations, and particularly in telephony. Largely this is true, but occasionally foreign practice sets us a good example and one which it is well to heed. Under the Telegraph's Act of 1899 British municipalities were empowered, without recourse to the Postmaster-General, to conduct telephone exchanges on their own account. Of course, such installations would be in direct competition to the National Telephone Company and its affiliations with this corporation in this country are so close as to cause its methods in England to bear a close resemblance to those of the American Bell in America. Another statute in Great Britain further provides that when the number of subscribers to any municipal exchange shall equal half the subscribers to the National exchange, the two companies shall interchange messages without any additional charge to subscribers. This is an enactment which has been greatly dreaded in America and to avoid which the American Bell Company is reported to have exercised all of the legislative influence which it could command. Mr. Donald's municipal year book for the United Kingdom gives some interesting statistics with regard to the foreign municipal exchanges. At the close of 1893 Portsmouth had 1,496 instruments in operation. For flat rate service a tariff of \$29 a year was maintained, while for measured service the plan of an annual rate of \$17.50 and a tariff of one cent per message, also an annual tariff of \$12.50 and two cents per message has been established. As this exchange has only been in operation about nine months a full year's returns are unavailable. At Swansea the municipal exchange serves its patrons with unlimited service at \$25 per annum, with a measured service rate of \$15 and two cents per message. Guernsey has a popular tariff of \$7.50 per annum with a tariff of two cents per message. The Guernsey exchange has 1,215 instruments and has been in operation nearly six years. Its latest financial statement showed

a net profit, after providing for interest, sinking funds and depreciation, of \$785. In Glasgow there is a population of 781,000, covering an area of about 143 square miles. Its municipal exchange offers flat rate service for \$26 per year to all subscribers, and there are 10,632 instruments in service. This exchange is now larger than that of the National Company in the same city, and more than half of the subscribers are those which had never previously employed the telephone.

THE NORTH ELECTRIC COMPANY WINS.

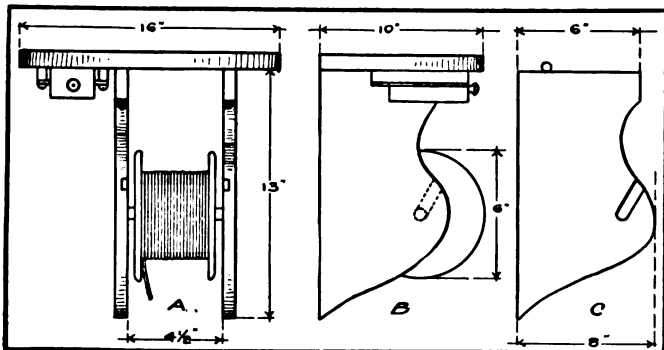
THE North Electric Company of Cleveland, Ohio, has won another decision over the Western Electric Company covering important telephone patents. The suit was the Western Electric Company vs. The North Electric Company on the Warner drop.

The case was decided in favor of the North Electric Company in one of the lower courts on April 5th. The Western Electric Company then took an appeal to the Sixth U. S. Circuit Court of Appeals at Cincinnati. Judges Lurton, Severence and Richards affirmed the decision of the lower court. This latest decision is final, and completely settles the question of the ownership of the Warner drop patents.

A CONVENIENT SHELF FOR A SOLDERING IRON FURNACE.

By OTIS J. DORWIN.

A VERY useful shelf to support the furnace for heating the irons used in an exchange can be easily constructed from boards taken from shipping boxes. With a keyhole saw cut out two pieces as shown at C in the figure, each to be $\frac{3}{4}$ of an inch thick and 13×8 inches in area. On the inner side of each of these pieces, a slot $\frac{3}{8}$ of an inch wide and two inches long should be chiseled out. This slot is to support an axle which holds a spool of flux solder. The axle should be just



enough longer than the spool to fit snugly between the two side pieces of the shelf and of a diameter to slip freely into the spool. This allows the spool to turn easily and to be readily removed from its rack when desired.

A small sliding drawer of a convenient size about 3×4 inches should be made and placed under the top of the shelf and to one side of the spool supports. This brings the matches within easy reach of the furnace. The shelf should be placed at a convenient height near the cross connecting rack at a point where the iron will be most used. A is a front view and B an end view of the device.

THE CUMBERLAND COMPANY HELD UP.

THE Conduit Committee of the City Council of Nashville, Tenn., has postponed action on the request of the Cumberland Telephone Co. to put its wires into conduits, until it has investigated. The committee felt that the Cumberland Company ought to make some return for the privilege asked, but the company's attorney stated emphatically that they would not even allow the city's fire alarm wires to go into the conduits, so there is the hitch. The committee does not understand this sudden desire of the Cumberland people to spend \$400,000 in putting their wires underground when there is no law to compel them to do so, and it is going to take time to find out the reason.

ATTENDED CONVENTION BY TELEPHONE.

BY means of a telephone placed near the speaker's chair at the Republican convention, held in Indianapolis last week, newspaper men and subscribers to telephone service in a number of towns and cities in Indiana were enabled to hear the speeches and reports of the balloting without going to the convention. The Domestic News Exchange, with the co-operation of the local telephone company made the arrangements, which were most successful.

HAVE CUT OUT THE BELL BUSINESS.

THE Cadiz Telephone Company, the original and largest co-operative company in Henry county, Ind., will in the future have no business relations with the Bell. At a recent meeting of the stockholders a resolution was passed declaring all business in the future would be done with independent companies. It was asserted at the meeting that the Bell people were putting forth every effort to secure control of the system, which is composed of twenty-nine rural lines and has connection with all towns in the county by direct lines.

RUN ON A BANK CAUSED BY AN OPERATOR.

A TELEPHONE girl in Indianapolis heard over the telephone that the Indianapolis Trust Company would not cash a certain check. The trouble was that it was not certified, but the girl did not understand that and so she hastened to inform her acquaintances over the telephone that the trust company could not pay its obligations. The result was a run that for a time assumed alarming proportions. The company is one of the largest and best financial institutions in the State, but the run that was precipitated threatened at one time to extend to all the other banks in town.

CHINESE TELEPHONES TO BE DIFFERENT.

NONE of the common, ordinary brownwood and nickel-plated telephones used for commercial purposes will be installed in the Chinese Government pavilion at the World's Fair. Kee Owyang of the commission has decided that a different sort of telephone must be provided. Just what sort it will be is not yet known, "but it will be different, something out of the usual," explained the representative of the commission. The woodwork of the telephone will be painted red and gold to harmonize with the colors of the pavilion.

A TELEPHONE WAR IN PARIS.

A WAR of no small importance is being waged in Paris that overshadows the war in the Far East.

It is notorious that Parisians are at the mercy of the telephone company and the operators consider the patrons of small consequence in their estimation.

As an instance of the treatment generally received by subscribers the case of Mlle. Sylviac, a well-known French actress, may be cited. She was at her home a few days ago when she found it necessary to use her telephone. She called for three-quarters of an hour before "central" responded.

Mlle. Sylviac rebuked the girl and the latter gave the actress an insolent reply. Thereupon she called up the superintendent, and reported the operator. The superintendent defended the employee.

The next day Mlle. Sylviac received notice that she could no longer have the use of the telephone unless she apologized to the telephone girl.

The actress discovered later that the number for which she had asked had not been called up at all. She has instructed her lawyer to begin an action against the company to compel it to restore her telephone rights.

MUST NOT SWEAR OVER THE TELEPHONE.

THE young women operators in the local exchanges in Muncie, Ind., are requested to report to the police the names of persons accustomed to use profanity over the telephones. For this offense they will be arrested and punished. The Indiana courts have decided that swearing over the telephone is punishable under the statute.

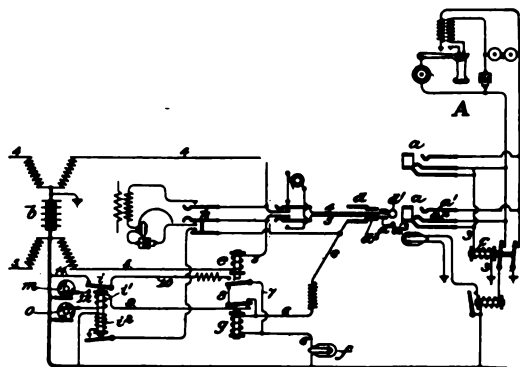
TELEPHONE



PATENTS

AN IMPROVED SUPERVISORY SIGNAL.

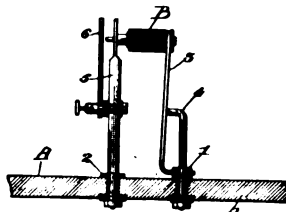
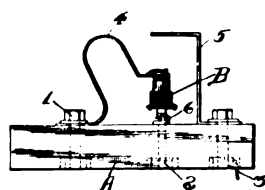
E. H. Smythe, of Freeport, Ill., patents (No. 758,116) an improved supervisory signalling circuit. This is illustrated by the accompanying circuit drawing, which shows the subscriber's substation and one-half of the cord circuit. Mr. Smythe introduces the relays *e*, *g* and *i*, the object of which is to make the supervisory signal more explicit than is usual at the present time. The relays *e*, *g* and *i* serve in connection with the commutator *m* and *o* and causes the supervisory signal to give three distinct indications. When the operator inserts the plug into the connecting jack the signal lamp *f* is steadily illuminated and remains bright in the usual manner until the subscriber removes his telephone from the hook. The lamp *f* is then extinguished on completion of the conversation if the subscriber hangs up, and under these



circumstances the commutator *m* causes the signal lamp *f* to emit slow flashes. But if the subscriber immediately desires another connection he again removes his receiver and then the commutator *o* causes the lamp *f* to emit a series of rapid flashes, thus the operator knows that if the lamp is burning steadily the subscriber has not answered. If the lamp is dark the subscriber is talking. If it is flashing slowly conversation is completed and if it is flashing rapidly another connection is wanted.

PROTECTIVE DEVICE.

Michael Setter, Chicago, Ill., patents (Nos. 757,972 and 757,971) improvements in telephone protective devices and assigns to P. C. Burns and J. G. Ihmsen, of Chicago, Ill. The subject of these two patents is an improved protective device in the nature of a heat coil. The essential feature of these patents is the construction of the heat coil comprising a coil of resistance wire which surrounds a pin that is held in place by means of a shoulder



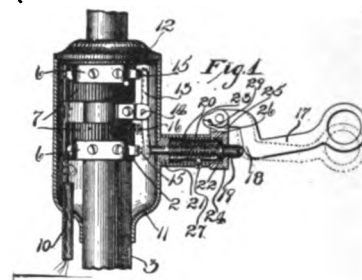
which bears upon a metal washer. An abnormal current develops sufficient heat in the resistance wire to melt the washer and free the pin. In patent 757,971 the coil is placed between retaining springs in compression. In patent 757,972 the coil is held in tension.

IMPROVED SUB-STATION SET.

A. R. Fergusson, of New York, N. Y., is granted two patents for improved sub-station sets and assigns to the Electro-Mechanical Specialty Company, N. Y. The first of these patents (No. 758,304) relates to the mounting of a desk set. It provides a tubular adjustable arm which may be clamped to a desk or neighboring

woodwork provided with universal joints so that the transmitter may easily and quickly be placed in any desired position.

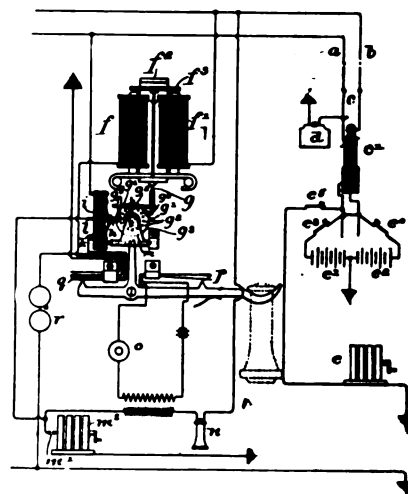
The second patent (No. 758,306) relates particularly to the hookswitch which is used in connection with the desk set pre-



viously mentioned. This device is shown in the accompanying illustration, from which it will be perceived that upon the rod 3 there are three collars, 6, 7 and 6. The center collar 7 carries a pivot 14 in which there is a lever 13 that is arranged to make contacts at 15 and 15. This lever is operated by means of the pin 18, upon the end of which the hookswitch bears.

IMPROVED PARTY LINE SYSTEM.

Albert Meinema, of Chicago, Ill., patents (No. 757,826) an improved party line system. This invention belongs to the familiar class of step-by-step systems in which each station is fitted with a rotating commutator wheel, *g*, moved by the pulsations of an



electro-magnet, *F*, the different wheels being furnished with conducting or nonconducting segments, in such positions that no bell or telephone of a substation is in circuit unless the commutator of that station receives the proper number of pulsations to close the conducting segments with the local circuits. A diagram of the invention is shown in the figure.

SELECTIVE PARTY LINE SYSTEM.

L. E. Brock, of Celina, Ohio, patents (No. 756,824) an improved method of party line signalling. In this device the inventor arranges a step by step motion which is operated electro-mechanically and by this means picks out any particular station to which it is desired to communicate.

TELEPHONE RECEIVER SUPPORT.

J. A. Brown, Warren, Ohio, patents (No. 757,257) an improved telephone receiver support, which consists in an arm which is pivoted to a portion of the woodwork of the substation set on the end of which the receiver is secured by means of a clamp in such position as to be readily adjusted to the ear.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



CAUSE OF TEST RELAYS STICKING.—(327.)

Our board is wired with the Kellogg cord circuit and we have trouble with the test relays sticking up. Can you explain the cause and suggest a remedy?
S. A. B.

Your trouble is caused by leakage of battery current from the sleeve side of the cord circuit to the tip side. This leakage finds a path to ground through the test relay and this causes it to stick. This leakage may be very slight for any one cord, but as the test lead is common to all the cords in the position, the combined effect is sufficient to operate the test relay, which is necessarily

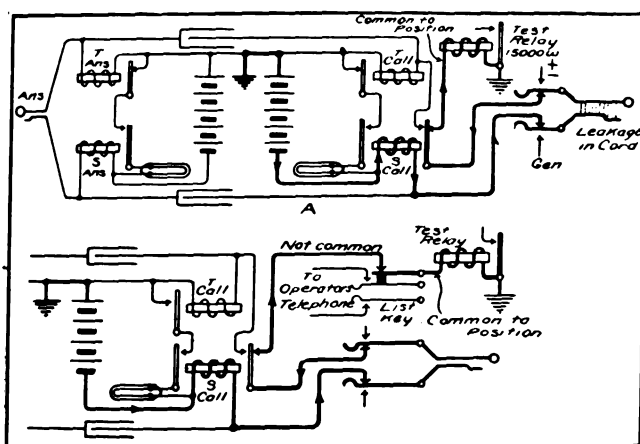


Fig. 327.

very sensitive. This is shown very clearly in Fig. 327, A. The trouble may be partially remedied by using a good quality of switchboard cord, as the leakage will be found to occur almost entirely in the cord itself.

A surer method is shown in Fig. 327, B. The test common is taken off and an individual lead run from each sleeve calling relay to a special contact spring on the corresponding listening key. This spring is arranged to make contact with the common test lead only when the listening key is thrown into the listening position. It will thus be seen that the test relay is connected to but one cord at a time and the leakage on one cord ought not to be sufficient to affect the relay. If it should be, the cord is evidently defective and ought to be replaced.

DIFFERENCE BETWEEN LOCAL AND COMMON BATTERY TRANSMITTERS (328).

What is the difference between local and common battery transmitters? Also, is there any way to use a local transmitter on a common battery talking line?
M. F. D.

The only difference between the local and common battery transmitter is in its resistance, the latter being made high so as to work economically on the high voltage of the common battery system. The resistance is usually made high by using a fine

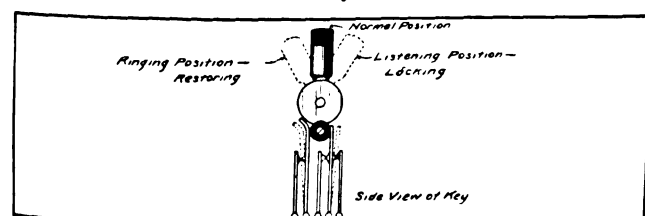


Fig. 330a.

granular carbon—granules which will pass through a 60 or 80 per inch mesh sieve. The normal resistance averages about 100 ohms for the instrument. The local battery transmitter has a

normal resistance of about 20 ohms. It will work on common battery, but will not give satisfactory results on account of its small resistance change when actuated by the voice. The local battery transmitter can be refilled with the proper size of granular carbon so as to work on common battery lines, provided the electrodes are of the proper size and distance apart. In any case the filling must be determined experimentally.

NATURE OF TALKING CURRENT.—(329.)

Two telephones, S and S, Fig. 329, on a private line are fed battery through a retardation coils, of 40 ohms each. Each set has only a receiver and transmitter in series. Will the coils I and I' retard the talking currents flowing from S to S, as much as they would current that had gone through an induction coil and was alternating?
L. E. D.

Talking current is alternating in effect as it is a varying current, and while, in the case cited, it is not alternating in character, yet it has the same properties with respect to the retardation of the

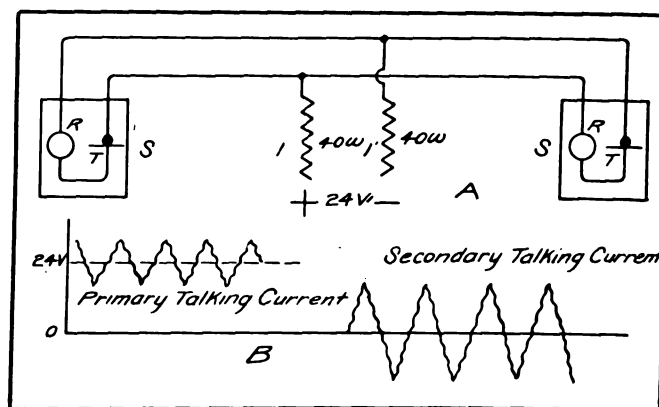


Fig. 329.

coils. Fig. 329 at B shows the primary current, or talking current, which has not been transformed by an induction coil, also talking current which has been transformed by an induction coil.

COMBINED RINGING AND LISTENING KEY.—(330.)

Can you give me a diagram of a combined ringing and listening key that operates with one button or lever?
E. A. T.

Figs. 330a and b show diagrams of a ringing and listening key, which will operate according to your specifications. The key

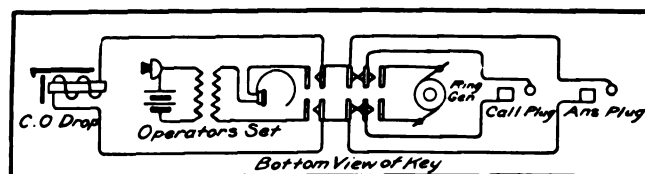


Fig. 330b.

shown is a standard type made by nearly all manufacturers of switchboard apparatus.

GROUND POTENTIAL.—(331.)

What is ground potential?

C. T.

The term ground potential is so employed to designate the difference of potential which exists between two points upon the earth's surface. Thus, for example, in the neighborhood of an electric railway power station the earth is usually charged by the current from the dynamos and is consequently at a different potential from that which would be found at some distant point from the station.



THE WEEK'S MESSAGES

FINANCIAL

ST. PETERSBURG, FLA.—The West Coast Telephone Company, capital \$10,000, has been chartered to construct, install, maintain and operate local telephone exchanges in the cities of St. Petersburg, Clearwater and Tarpon Springs, Fla. John D. Darry, Horace B. Webster, Amos P. Avery, Leroy B. Scott and Ralph Q. Raymond are the stockholders.

DES MOINES, IA.—The Mutual Telephone Company has filed with the County Recorder a mortgage to the Iowa Loan & Trust Company in the amount of \$185,000, covering all the possessions of the company.

MOVILLE, IA.—The Arlington Telephone Company, of Menville, has increased its capital stock from \$5,000 to \$25,000.

BATTLE CREEK, MICH.—The Calhoun County Telephone Company will be reorganized under the name of the Citizens' Telephone Company. The capital stock will be increased to \$100,000. The plant will be bonded for \$200,000.

TRUMAN, MINN.—The Armstrong Telephone Exchange Company of Truman has increased its capital stock from \$25,000 to \$100,000.

HARDIN, MO.—The Calhoun Telephone Company of Hardin has increased its capital stock from \$15,000 to \$25,000.

OTTERVILLE, MO.—The Otterville Smithton Telephone Company of Otterville has increased its capital stock from \$2,000 to \$5,000.

DE WITT, NEB.—The De Witt Telephone Company has increased its capital stock to \$20,000, and will make extensive improvements in the local exchange.

AMSTERDAM, N. Y.—The Amsterdam Automatic Telephone Company has increased its capital stock from \$15,000 to \$100,000.

TROY, N. Y.—The Commercial Union Telephone Company of Troy has increased its capital stock from \$10,000 to \$80,000.

GREENSPRING, OHIO.—The Greenspring Telephone Company has increased its capital stock from \$20,000 to \$35,000.

YANKTON, S. D.—The Independent telephone company of Yankton has declared a dividend of 12 per cent. Its long distance lines will connect with Sioux Falls and Sioux City.

FORT WORTH, TEX.—The People's Home Telephone Company, which is constructing a long distance line from Gainesville to Fort Worth, has executed to the Royal Trust Company, of Chicago, a deed of trust on all property to secure \$250,000 of first mortgage bonds.

PRINCETON, TEX.—The Princeton Telephone Company has increased its capital stock from \$25,000 to \$240,000.

FRANCHISES

SAN BERNARDINO, CAL.—The Home Telephone Company has been granted a franchise in the city of Colton. Under the terms of the franchise as granted the town is to receive 2 per cent. of the gross proceeds after the company has been in operation for five years and the company must expend \$1,000 within six months and \$1,000 monthly thereafter until \$5,000 has been put into the system.

DUBUQUE, IA.—The Standard Telephone Company of Dubuque has asked the city council of Charles City for a franchise to install a copper metallic system in that city, with all wires underground in the business section.

SHAKOPEE, MINN.—Charles W. Kopp, C. T. Buchanan and George H. Reis have been granted a local telephone franchise.

EUROPA, MISS.—A franchise has been granted for a telephone system here.

WESTFIELD, N. J.—The Northeastern Telephone Company has been granted a franchise to run its line through a part of Westfield.

BABYLON, L. I., N. Y.—Paul E. De Fere, representing the New York and Long Island Telephone Company, has been granted a franchise by the Village Board permitting his company to come into Babylon by using underground construction.

ELECTIONS

MEMPHIS, MO.—The Scotland County Mutual Telephone Company held its annual meeting here recently. The following officers were re-elected: C. M. Moore, president; George Soyer, vice-president; J. L. Tennant, secretary; M. M. Meyers, treasurer.

SCRIBNER, NEB.—The Farmers' Telephone Company has elected the following officers: John Emanuel, president; Fred Howe, vice-president; A. J. Hasson, treasurer; H. G. Meyer, secretary.

RATHRONE, N. Y.—The annual meeting of the Canister Valley Telephone Company was held here recently and the following officers elected: Willard Talbot, president; G. M. Loyd, treasurer.

MILTON, N. D.—The Milton Telephone Company held a meeting recently and elected officers to serve till June 1st, when the annual meeting will be held.

BEDFORD, PA.—The annual meeting of the stockholders of the Bedford-Fulton Telephone Company was held at Everett recently. The following directors were elected: W. H. Baumgardner, of Wells Tannery; Dr. R. B. Camel of New Granada; John Q. Nycum, of Rays Hill; E. N. Palmer, Dr. H. W. Bender, John S. Hershberger, Thos. A. Jones, W. W. McDaniel, and C. G. Masters, of Everett.

RICHARDSON, TEX.—At the annual meeting of the stockholders of the Richardson Telephone Company here the following officers were elected for the ensuing year: Sam P. Harben, president; W. T. McKamy, secretary and treasurer; H. W. Coit, W. A. Watson, Joe Prigmore, W. O. Bishop, W. T. McKamy, J. M. Campbell and S. P. Harben, directors. The affairs of the company are in good condition and extensive repairs will soon be made.

SEYMOUR, TEX.—The Proffitt Telephone System and the Seymour Telephone System will be consolidated under the name of the Proffitt Telephone Company, which will be incorporated with a capital stock of \$40,000. John

Proffitt will be president; John H. Proffitt, secretary; T. Hayter, treasurer, and W. L. Logan, general manager.

COMBINATIONS

ATLANTA, GA.—The connection of the Commercial Telephone Company of Atlanta, with the system of its successor, the Georgia division of the Gainesboro Long Distance Telephone Company, of Carrollton, Ga., has been perfected, when the connecting link between Turin and Senoia, the termini of the two systems, was bridged. The acquisition of the Atlanta company gives the present Carrollton office control of about 600 miles of wire over seventeen counties, more than a dozen exchanges and nearly seventy-five stations.

ALFORDSVILLE, IND.—F. D. Grismore and D. E. Elliott have purchased the local telephone system and will rebuild it.

BATTLE GROUND, IND.—The Cairo Telephone Company's plant in this city has been sold to E. T. Roadruck of Brookston. Mr. Roadruck will install a new switchboard and otherwise expand and improve the system.

BLOOMINGTON, IND.—J. C. Montieth has purchased the Bloomington Telephone plant. Mr. Montieth will entirely rebuild the plant and extend several new lines.

ROYAL CENTER, IND.—The Thomas McComb telephone plant in this city has been sold to H. S. Akers, of Ambia, Ind. A modern switchboard will be installed and the plant thoroughly improved.

ELDON, IA.—Clyde A. Mann has purchased the plant of the Eldon Independent Telephone Company.

COVINGTON, KY.—Sol Kineon and associates have secured a controlling interest in the Merchants, Police and District Telegraph Company of Covington, which claims to have a franchise.

PINEVILLE, KY.—Mrs. N. Starkey, who owned two-thirds of the stock of the New Pineville Telephone Company, has sold her interest to Messrs. J. C. Brown and G. S. Brock, of Laurel County, who already own the other one-third of the stock.

BEATRICE, NEB.—The toll lines and personal property of the Interstate Telephone Company in Gage County has been sold to Hugh J. Dobbs, of Beatrice.

HUNTINGTON, W. VA.—The Mutual Telephone Company of this town has completed a traffic agreement with the Ohio Valley Company of Proctorville, Ohio.

PERSONAL

MR. R. B. ABBOTT, who was formerly with the Chicago office of the John A. Roeblings' Sons Company, Chicago, and more recently Chicago sales agent for the National Wire Corporation, returned to the Roebling Company on May 1st.

GEORGE H. AYERS, of Highland Mills, N. Y., the secretary of the Orange and Sussex Counties Independent Telephone Association, has returned from a much-needed vacation.

D. L. BERRY, of Grand Rapids, Mich., has just accepted the agency of the Sterling Electric Company, of Lafayette, Ind., in Michigan. He will handle a full line of apparatus and will be glad to show all telephone companies his samples.

HERBERT BRIANT, assistant engineer New York Telephone Company, has been elected associate member of the American Institute of Electrical Engineers.

W. H. COLLEY, of Cleveland, has been appointed manager of the Galion, Ohio, Telephone Company.

FRED E. FREERS, now traveling in the Western territory for the Sterling Electric Company of Lafayette, Ind., carries a full line of Sterling high-grade apparatus, and would be glad to meet any prospective buyers.

W. A. GILES, President of the Clark Automatic Telephone Company, is superintending the construction of a system at Graniteville, Ga.

WILBUR H. JOHNSTON, assistant superintendent of the Frontier Telephone Company, Buffalo, N. Y., lectured before the Buffalo society of Natural Sciences last week.

S. C. PLATT, of 346 Broadway, New York City, is now representing the Sterling Electric Company, of Lafayette, Ind., in all Eastern States.

F. M. ROSS, formerly of various supply houses, has now accepted the position as a traveling representative in Indiana and Illinois for the Sterling Electric Company of Lafayette, Ind.

JOHN SWARTZ has been appointed manager of the telephone system at Elba, N. Y.

MISCELLANEOUS

SPRINGFIELD, ILL.—The Chicago and Alton railroad has adopted a telephone system for the convenience of freight conductors and for the rapid movement of trains.

PLYMOUTH, IND.—The Plymouth Telephone Company has been in business for ten years. At present it has connection with all the towns in Indiana, Michigan and Western Ohio.

CLAY CENTRE, KANS.—The Clay Centre Telephone Company now has over four hundred subscribers.

TOPEKA, KANS.—The Independent Telephone Company has now over 2,300 subscribers. Connection has been made with Kansas City.

CARTHAGE, MO.—The Red Oak, Meinert and Lockwood Telephone Company will connect with the Home company here, giving service to the towns of Meinert, Red Oak, Lockwood, Miller, Golden City, Avilla, and Dundenville.

HANNIBAL, MO.—The stockholders of the Bluff City Telephone Company held a meeting here recently. Besides the local stockholders Judge Withrow and H. C. Pwintling, of Mt. Pleasant, Ia., and C. H. Brown, of Burlington, Ia., were present.

KANSAS CITY, MO.—The Western Independent Telephone Company, which is allied with the Kansas City Home Telephone Company, has opened long distance connections with Topeka, Abilene, Manhattan, Holton, Kan., St. Joseph and Atchison.

ST. LOUIS, MO.—The Kinloch Telephone Company will install a model telephone exchange in the Palace of Electricity at the Exposition. The switchboard will be equipped for 1,000 lines. Instruments will be placed in all the buildings and also in all parts of the grounds.

BUFFALO, N. Y.—The Buffalo & Susquehanna Railway Company is equipping its freight trains with telephones. Connection is made with the wires along the railroad by means of a sectional pole that has a hook to fasten on the wire.

BUFFALO, N. Y.—The Inter-Ocean Telephone and Telegraph Company reports a great increase in its long distance business. This company connects with 500 towns and has over 50,000 subscribers.

HAMILTON, OHIO.—The Hamilton Home Telephone Company now has long distance connection with Dayton and all other towns in Ohio except Cincinnati. All of the State of Indiana can be reached, besides Detroit, Pittsburgh, and Wheeling, W. Va.

NEWARK, OHIO.—The Newark Telephone Company has leased new offices and is building an addition to its switchboard to take care of the rural lines and increasing number of city subscribers.

LIMA, PERU, S. A.—A telephone system will be installed here by American capitalists and if successful exchanges will be established in other cities.

The Peruvian Government will subsidize the undertaking besides granting a monopoly.

LYNCHBURG, VA.—The Home Telephone Company is rapidly increasing its business, and proposes to install a new central energy switchboard.

UNDERGROUND

ELKHART, IND.—The Central Union Telephone Company has asked permission to place an underground conduit for its telephone cables on certain streets.

CLARION, IA.—The Clarion & Southwestern Telephone Company is making arrangements to place all the wires in the business section of the city underground.

NEW COMPANY NOTES.

TROY, N. C.—The Troy Telephone Company, of this town, has received a charter. The officers are: John C. Kennedy, president; J. C. Davis, vice-president; J. T. Solomons, secretary and treasurer, and W. H. Robinson, business manager.

WELCH, W. VA.—The Dry Fork Telephone Company has been chartered here, to construct and operate a telephone line in McDowell County. Capital, \$10,000. Incorporators: J. A. Hardy, J. R. Anville, Jaeger, W. Va.; B. F. Williams and D. R. Smith, Welch, W. Va.



New Construction in the Field



TEXARKANA, ARK.—The new long distance telephone company has constructed a line to Honey Grove, Texas. A line will be built to Little Rock, Ark., and connections made to Fort Smith and St. Louis, Mo.

SAN DIEGO, CAL.—The Home Telephone Company will make extensive improvements and build underground conduits.

WESTPOINT, GA.—The Rural Telephone Line No. 2 will be extended into this place. W. N. Maddox, president of the Westpoint and Whitesville Telephone Company, is making the necessary arrangements.

EARLSVILLE, ILL.—The Northern Illinois Telephone Company is extending its lines in this vicinity. They have now 200 instruments working and expect to largely increase that number by the fall.

GALESBURG, ILL.—The Galva Telephone Company has completed connections with Kewanee. This line gives service to a large number of small towns, and besides connection to Aurora.

NEW HOLLAND, ILL.—The New Holland Telephone Company has been reorganized and will be greatly improved and extended.

PEORIA, ILL.—The Interstate Independent Telephone and Telegraph Company is running new underground cables here, which represent an outlay of nearly \$300,000.

SPRINGFIELD, ILL.—The Inter-State Telephone Company has secured 280 subscribers in Taylorville, and will install an exchange there.

STERLING, ILL.—The Interstate Telephone Company has completed a line to Emerson. This makes a total of 21 lines connected with the Sterling exchange with over 240 subscribers.

GREENFIELD, IND.—The New Palestine Telephone Company is extending its system in Shelby County. Connections are to be made with the Philadelphia Telephone Company and the Carrollton company.

CORYDEN, IND.—The Eureka Telephone Company will extend its lines to Convenience. The company has issued a new directory which shows it has exchanges at Coryden, Laconia and Mauckport. Edward F. Weddel is president, and H. P. Beanblossom is vice-president.

INDIANAPOLIS, IND.—The quarterly statement of the Delaware and Madison County Telephone Company shows a net increase in income of nearly \$6,000 over the same period last year.

RICHMOND, IND.—The Home Telephone Company is preparing to make a number of improvements to its exchange.

CROTON, IA.—The Southeastern Telephone Company will extend a line to Farmington.

DES MOINES, IA.—The Mutual Telephone Company has bought a building site for \$10,000 and will erect a \$15,000 office building. The new switchboard is expected by August 1st.

DOUGHERTY, IA.—The Iowa Mutual Telephone Company, of Hampton, will establish a local exchange here.

HARTFORD, IA.—The Union Telephone Company will connect its lines with the Citizens' company at New Hope. A line will be built into the Wall Lake district.

KEOKUK, IA.—The Mississippi Valley Telephone Company of Keokuk has a representative at Nauvoo making arrangements to install a system in that town. A cable will be laid across the river, and the plan is to build a line through Dallas City and Galesburg to Chicago.

NEW HARTFORD, IA.—The Farmers' Mutual Telephone Company will extend its lines east and south.

PAULINA, IA.—The Paulina Telephone Company is overhauling its system and building new lines.

SIOUX CITY, IA.—The Sioux City Telephone Company is rapidly completing its new system here. Proposals for real estate and the erection of an office building are being received. The building will be of brick and stone, and is to cost in the neighborhood of \$25,000. So far there is a waiting list of 2,500 patrons, which is increasing at the rate of ten a day. At present there are 300 men engaged in the construction of the plant.

WHITE OAK, IA.—The Highland Rural Telephone Company and the Lombont company have completed their lines to Freemont.

OKETO, KANS.—The Oketo Telephone Company has contracts signed for the construction of at least 35 miles of lines. It now operates 25 miles.

COFFEYVILLE, KAN.—The National Telephone Company will install a new common-battery board here. They will also erect a new brick office building.

TRIBUNE, KANS.—The Greeley County Telephone Company will install a switchboard here. This line between Tribune and Horace is now in working order.

TWIN CREEK, KANS.—The directors of the Osborn-Cheyenne Telephone Company at a meeting held here decided to construct a fifth line for the accommodation of its patrons. Two new lines will be constructed

from Osborne to Twin Creek. A new line will be constructed from Cheyenne to Delhi Township.

UPLAND, KANS.—The Farmers' Mutual Telephone Company of Upland is arranging for the construction of numerous farmer party lines.

HENDERSON, KY.—The Henderson Telephone Company will make extensive improvements in its system within a month or six weeks. It will install a new switchboard and construct a new line from Hopkinsville to Howell.

ASHFIELD, MASS.—The Heath Telephone Company has constructed a new line from here to Shelbourne Falls.

HALE, ME.—I. W. Mason, of Hale, is arranging to construct a private telephone line from here to Rumford Falls.

FAYETTE, MD.—The Howard County Telephone Company is rapidly extending its system. Improvements of lines and new switchboards are being pushed forward for the towns of Fayette, Higbie, Armstrong and Franklin. An extension cable system has been installed at Glascow.

BRIGHTON, MICH.—The Livingston County Mutual Telephone Company will install a local exchange.

HENDRUM, MINN.—The Hendrum Telephone Company is considering the construction of a line from here to Ada through Mary or Anthony.

PETERSON, MINN.—A new telephone line will be constructed from here to Bratsberg.

HIGGINSVILLE, MO.—The Home Telephone Company of Kansas City is building a line to St. Louis, and will connect with the Lafayette County system here. This will give local subscribers service to Kansas, Oklahoma, Indian Territory and Missouri.

NEEPER, MO.—A new exchange will soon be completed here, and will be connected with the Hurbinger Telephone Company.

WAYNESVILLE, MO.—The Dixon Telephone Company has extended its lines to Hooker.

PLATTMOUTH, NEB.—The Plattsmouth Telephone Company will take steps to open a long distance exchange in South Omaha.

WOODSTOWN, N. J.—The Salem County Board of Agriculture at a meeting held here recently decided to establish a rural telephone line.

ELBA, N. Y.—The Elba Telephone Company, John Swartz, manager, will construct a new line northeast of this place as soon as the weather permits.

KILLAWOG, N. Y.—The New Rural Telephone Company will be extended to Harford Mills.

NICHOLS, N. Y.—The Smithboro Independent Telephone Company will extend its line to connect with the Nichols Independent Company.

PRATTSBURG, N. Y.—H. L. Brush, owner of the People's Telephone Line of Pulteney, N. Y., has sold its system to the Overland Telephone Company of Prattsburg. Several improvements are contemplated.

SODUS, N. Y.—The construction of the Wayne-Monroe telephone system in this village has been commenced. Three hundred subscribers have been secured already.

VICTORY, N. Y.—The Victory Telephone Company has decided to construct a line from Red Creek to North Victory and Martville, with a short line to Victory.

ADAMSVILLE, OHIO.—The new system is nearly completed here. A 100-line board will be installed and toll service given over the United States lines.

GREENSBURG, PA.—The Pittsburgh-Johnstown Long-Distance Telephone Company will have a central office here. Their long-distance lines are No. 8 copper.

JOANNA, PA.—The Conestoga Telephone Company is rebuilding its line from here to Morgantown.

TROY, PA.—The Citizens' Mutual Telephone Company has begun the construction of a new system here.

LEAD, S. D.—The Home Telephone Company is improving its system.

MABANK, TEX.—A new Independent telephone system will be constructed at this place.

SMITHVILLE, TEX.—The Smithville Telephone Company is enlarging its plant and making many improvements on account of its increased business.

BRIDGEPORT, W. VA.—The Belmont Telephone Company is constructing two new lines to St. Clairesville.

MADISON, WIS.—The Edgerton Telephone Company has commenced stringing aerial cable to reduce the congested condition of the main lines in town.

SPRING PRAIRIE, WIS.—O. G. Farsdale, at the head of a company of farmers, organized to construct a rural telephone system with an exchange in this town.

TRADE NOTES

FRANK B. COOK, 140 Lake street, Chicago, Ill., has secured the license to the exclusive manufacture of all self soldering heat coil and protective devices belonging to the Rolfe Electric Company.

THE F. BISSELL COMPANY, of Toledo, O., has issued a catalogue dealing with insulating material, such as tape, varnishes, paints, mica, cloth, etc., together with solder, staples, cleats, clamps, dynamo brushes, bolts, in fact all material necessary for interior construction.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., has just received a large additional order for protectors and other apparatus for the Canton Home Telephone Company, Canton, Ill. It has also received an order for a private branch exchange to be installed in one of the finest banks in Albany, N. Y.

THE JULIUS ANDRAE AND SONS COMPANY, of Milwaukee, Wis., has issued a pamphlet which very thoroughly describes the "OK" underground distribution box it manufactures. This distribution box is especially intended for telephone, telegraph and fire alarm service. To all interested we would suggest their securing a copy.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., has just completed a four position toll board for the United States Telephone Company, to be used at Springfield, O. It also has just completed the installation of a 3,000 line common battery multiple switchboard at Chillicothe, O. This company reports a very large sale of telephones of all kinds.

THE FAHNESTOCK TRANSMITTER COMPANY, formerly of 74 Cortlandt street, New York City, manufacturer of the universal microphone and Fahnestock spring binding post, has removed to 132 Havemeyer street, Brooklyn, near the entrance to the new Williamsburg Bridge. The telephone number of the company in the new location is 3250 Williamsburg.

FRANK BYLER, a manufacturer, of West Chester, Pa., is the maker of a pole raising derrick which is doing some good work for Independent telephone companies. During the recent installation of the Conestoga Telephone Company's lines from Joanna to Hick Creek Valley, White Bear and Geigertown, Pa., all the poles were set by the aid of Mr. Byler's derrick. An average of about 50 poles per day were hoisted and set in the holes.

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., is receiving large orders for its various protector apparatus, especially its latest types, No. 250-A and No. 250-B, which many exchange managers have pronounced to be the finest of their kind. The company's latest folder describes this protector at every point, and can be had for the asking. This company has just equipped one of the large flat buildings at Springfield, O., with a complete telephone outfit, which will work in connection with the exchange it recently installed in that city.

THE CONNECTICUT ELECTRIC AND TELEPHONE COMPANY, of Meriden, Conn., has placed upon the market a new type of desk telephone which is meeting with great approval. Business this spring is reported by the company to be the best in its history. To introduce its new 1904 models they are making a special offer for the month of May, believing that every telephone man will appreciate the lasting qualities of these instruments, and that each sale will make a permanent customer. Bulletin No. 30 on magneto telephones will be sent on request.

THE LAMBERT SCHMIDT TELEPHONE MANUFACTURING COMPANY, Weehawken, N. J., has sent us a copy of its Catalogue No. 11. It comprises a description of the interior telephones which this firm manufactures. The catalogue comprises some 25 pages and is profusely illustrated. A novelty described is the Automatic Resetting Switch which is offered for speaking tube and interior telephone installations. Hotel systems and switchboards are illustrated and given descriptions. The company will be pleased to send the booklet to any one interested upon request.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, is having a constantly increasing demand for its new self-restoring drop switchboard equipment. In the "International" board the drop shutter is restored automatically by a small trigger mounted on a compensating spring between the jack springs in the path of the plug. The operator's answering plug, when inserted into the jack, operates the small trigger which restores the shutter. It is said that in this drop the plug, not coming in contact with the shutter, makes it one of the most positive non-infringing self-restoring drops on the market.

HAMMACHER, SCHLEMMER & COMPANY, the well-known hardware dealers, of New York City, issues a voluminous catalogue of some 810 pages, listing a very complete assortment of small tools of all descriptions and general hardware supplies. Each article is accompanied with a cut and a brief description, together with list price. In addition a substantial discount sheet of 44 pages is supplied, indicating the rebates upon various articles. The tools comprised are those used by machinists, carpenters, metal workers and allied trades, but the catalogue does not comprise anything in the nature of so-called machinery. A copy of the book should be in the possession of every exchange manager, as by it he can tell what a good fair price is on everything in the tool line that he is apt to use. To those who actually buy large quantities of tools the book is given free, but its cost is so great that a nominal charge of 60 cents is made to others for it. Where the catalogue holder sends to the concern an order for goods to the amount of \$10 or over, the 60 cents charge on the catalogue will be refunded on demand.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—Very liberal telephone franchise in hustling Western town of 5,000 population. For particulars, address I. S. MAHAN, Le Mars, Iowa. 172

FOR SALE.—A 100 line metallic or ground circuit Imperial switchboard in good condition. The only trouble is that it is too small for my requirements. S. L. MEACHAM, Fort Mill, S. C. 175

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL.

GILDART BROS., Albion, Mich. 168

WANTED—Second-Hand Telephone Apparatus, Central Energy and Magneto Switchboards, Magneto Bells, Telephones, Transmitters, Cable Terminals, Cross Connecting and Distributing Racks, Ringing and Charging Generators. Write immediately, price, condition and make. "C. E. W.," 17 S. Elizabeth street, Chicago, Ill. 167

POSITION WANTED.—Young man, experienced on clearing trouble in instruments and switchboards, desires position in small telephone exchange. Central States preferred. Address Box 176, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 176

POSITION WANTED.—Have had extended experience in engineering, construction, equipment and management of Bell and Independent exchanges. Graduate Electrical Engineer. Address Box 163, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 163

POSITION WANTED.—Experienced manager and engineer, desiring to make a change, will be at liberty June 1st. Has built and handled plants up to 10,000 telephones with success. Is fully conversant with all branches of the telephone business and with the most efficient and economical modern methods. Address Box 174, AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 174

WANTED—Position with good Independent company needing experienced man capable of building and maintaining local and long distance work. References regarding work and character. South preferred. Address Box 162, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 162

RECRUITS desired for Signal Corps U. S. Army. Pay ranges from \$13 to \$90 per month, and in addition rations, quarters, clothing and medical attendance are furnished. The reorganized Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence, and ability, who have had electrical training. For detailed information apply to Chief Signal Officer U. S. Army, Washington, D. C. 177

POLE YARDS BY THE DOZEN

Is a good deal more than we can boast. Our stock is concentrated into three main yards, especially "rush" orders being filled from the one at Detroit, Mich.

Wire us if you're in an especial hurry.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Empire Building.

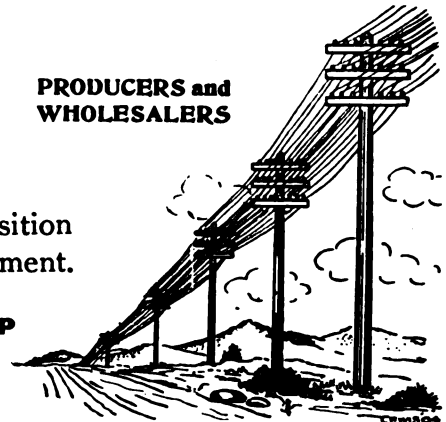
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

PRODUCERS and
WHOLESALEERS



"From the Stump
to the Line."



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-
ment.



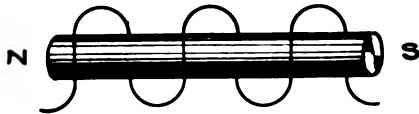
LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



THE POLES

of a magnet have to be
magnetized to attract.

OUR POLES

attract on their merits alone.
Write us now, telling us
what you are going to build,
and we'll tell you the poles
you need and give you at-
tractive quotations.

Sand Point Cedar Co.

SAND POINT, IDAHO

The Valentine-Clark Co.

*Begin to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before
for maintaining their prominent position among the
leaders in the cedar industry. Making a specialty
of Poles, they are identified with the leading pro-
ducing sections, concentrate their material at advan-
tageous shipping points and are in position for giv-
ing their customers the best of service.

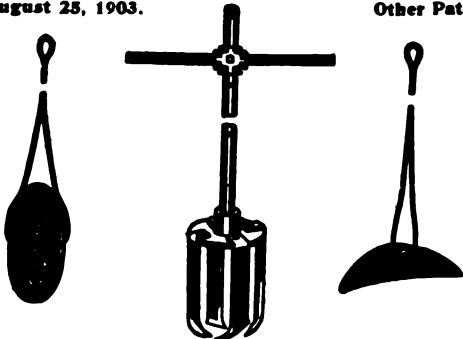
Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

"THEY NEVER PULL UP"

Patented August 25, 1903.

Other Patents Pending



Write for Description and Prices.
THE MILLER ANCHOR CO., Norwalk, Ohio

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Standard Underground Cable Co. 12
Standard Vitrified Conduit Co. 36
Stanton, L. W. 34
Sterling, W. C., & Son 33
Sterling Electric Co. 11
Stromberg-Carlson Telephone Mfg. Co. 4
Swedish-American Tel. Co. 12
Telephone Printing Co. 34
Valentine Clark Co. 30
Vought-Berger Co. 7
Wanted, Situations, etc. 304
Western Telephone Mfg. Co. 6
Weston Electrical Instrument Co. 34
Wisconsin Timber & Land Co. 33
Worcester, C. H., Co. 29
Yesbera Mfg. Co. 29

ATTORNEYS.

Munk, Otto, New York City.

BATTERIES.

Burnley Battery Co., Painesville, Ohio.
Electric Appliance Co., Chicago, Ill.
Nungesser Electric Battery Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

BLANKS, BOOKS AND FORMS.

Telephone Printing Co., Defiance, Ohio.

BONDS.

J. W. Middleton & Co., Chicago, Ill.

BRASS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

BOOTHES.

Yesbera Mfg. Co., Toledo, O.

CABLES.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.

Okonite Co., New York.
Roebling's Sons Co., John A. Trenton, N. J.
Standard Underground Cable Co., Pittsburg, Pa.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CABLE HANGERS.

Bissell Co., The F., Toledo, O.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Telephone Supply Co., Cleveland, O.
Standard Underground Cable Co., Pittsburg, Pa.

CABLE SLEEVES.

Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.

CARD INDEX SYSTEMS.

Telephone Printing Co., Defiance, Ohio.

CIRCUIT CLOSERS.

Garton-Daniels Co., Keokuk, Ia.

CLIMBERS.

Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

CONDUITS.

American Conduit Co., Chicago, Ill.
American Vitrified Conduit Co., New York.
Camp Co., The H. B., New York.
Gest, G. M., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Standard Vitrified Conduit Co., New York.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.

CONNECTORS.

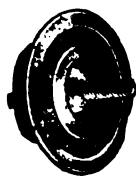
Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.

CONTINUED ON PAGE 31.

Reliance Transmitter No. 90



For mounting on woodwork
or adjustable arms



The Button
(actual size)

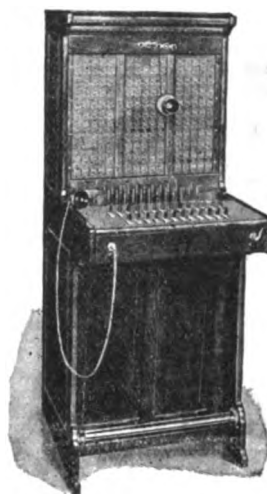
ORDER ONE TO-DAY
SAMPLE PREPAID

\$1.00

S. H. COUCH CO.

162 PEARL ST., BOSTON, MASS.

IT'S OUR BUSINESS to convince you that in our new type EXPRESS BOARD



*We have reached
the acme of*

*Electrical and
Mechanical
Perfection*

*Made in any
desired capacity
up to 1000 lines*

*Descriptive matter, sample parts
and quotations on request*

INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO, ILLINOIS

ADVERTISERS' DIRECTORY—Continued

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Erner Hopkins Co., Columbus, O.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LATHES.

Scribner, A. C., Gloversville, N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

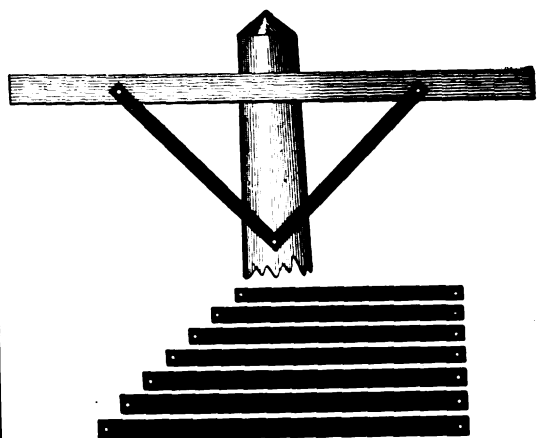
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

PLAIN JAPANNED GALVANIZED

All sizes and lengths—and at prices just a little lower than usual—and the quality better. The reasons are obvious—we make our own Steel, have our own Galvanizing Plant and our patrons benefit by the saving in cost of production. Quotations gladly made by the thousand or pound on application.

INLAND STEEL COMPANY

MARQUETTE BUILDING

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MICHIGAN

IDAHO

THE LINDSLEY BROS. CO.

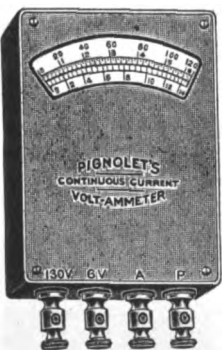
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.

MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO. MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Cost of Construction Reduced
By Purchasing Chestnut Telephone
POLES and POSTS
From FRANK MULLEN, Ewing, IND.
Reasons Why for the Asking

LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES
For Special Use Carried in Full Stocks and
Sold at Reasonable Prices
THE MEDORA MILLING CO.,
MEDORA, INDIANA

Oak Insulator Pins and Brackets

Direct from North Carolina's immense
Forest to you.
Orders filled at once; no delays, no "cuss-
ing." TRANSPPOSITION PINS, etc. a specialty.
ELKIN MACHINE CO.
ELKIN, N. C.

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.
CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG,
INDIANA.

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. CHURCHILL
HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR
POLES
25 to 80 ft. long.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross
ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

R. E. ARMS, Manager.
LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

We Make
a Specialty
of
Telephone
Poles.

P
O
L
E
S

Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural
Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W 22d St.
CHICAGO, ILL.

Pendleton & Gilkey
816 Lumber Exchange, Minneapolis, Minn.

**P O L E
R O D U C E R S**

You're sure of getting the lowest
price when you order from us. We're
producers, that's why.

Our Poles, too, are as fine as you'll
get anywhere. We think they're a
little better.

Try us the next time. Write
for delivered prices on ...

WHITE CEDAR POLES



Do you always mention the

American Telephone Journal

when writing to advertisers? It will be
appreciated by all concerned if you do.

HIPWELL MANUFACTURING COMPANY, ALLEGHENY, PA. High Grade Long Distance Telephones

23 Years' Experience Guarantees Satisfaction.
WRITE YOUR WANTS TO

CHICAGO
Telephone Apparatus Exchange
TELEPHONE ACCESSORIES
BOUGHT, SOLD AND EXCHANGED
17 S. Elizabeth Street, CHICAGO, ILL.



J. W. Middleton & Co.
PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
ELECTRICAL ENGINEER
AND CONTRACTOR " " "
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Blank Books and Forms FOR TELEPHONE EXCHANGE and TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.
Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

Tell the Advertiser you saw his
announcement in

**The American
Telephone Journal.**

The Erner Hopkins Co. Wholesale
Electrical
Supplies
WRITE US FOR PRICES. WE CAN SAVE YOU MONEY.
The ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
ROME, N. Y.
Chicago Office: 1501 Monadnock Bldg.,
CHICAGO.

Keeling & Ridge Co.
General Contractors
Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.
Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL, \$250,000.00.
Main Offices, 851-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters
Milammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrumen-
Co., Ritterstrasse, No. 88.
LONDON—H. Elliott Bros., Century Works, Lewisham.
PARIS—FRANCE—R. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



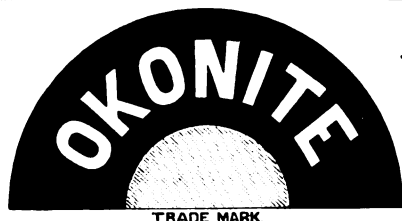
Weston Standard Portable Direct Reading Voltmeter.

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.



TRADE MARK.

1889—Paris Exposition Medal for Rubber Insulation

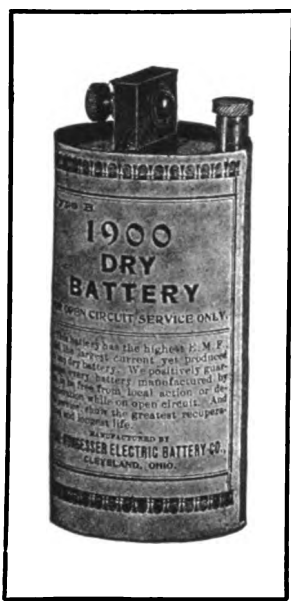
1893—World's Fair Medal for Rubber Insulation

The Standard for Rubber Insulation
Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., Sole Manufacturers, 253 BROADWAY, NEW YORK

WILLARD L. CANDEE, {
H. DURANT CHEEVER, { Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

It is not necessary to prove that the 1900 DRY BATTERY



IS THE BEST  WE ADMIT IT

This Battery is carried in stock by all supply houses throughout the entire United States, Europe, Asia, Africa, Central and South America.

When you send your order to your dealer for Batteries, specify the

“1900”

The manufacturers stand behind the quality of the goods.

THE NUNOESSER ELECTRIC BATTERY COMPANY.

National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand

IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK

CHICAGO

BOSTON

DE KALB

KANSAS CITY

NEW HAVEN

SAN FRANCISCO

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and **Electrolysis Proof**.

A duct that is and remains **Perfectly Aligned**, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

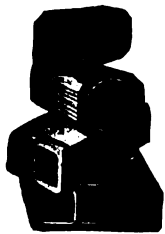
B. S. BARNARD, Manager.

**39-41 Cortlandt Street,
NEW YORK.**

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S (Patent) CONNECTORS AND TERMINALS

THE C. McINTIRE CO.
13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.



Automatic Telephones

**Privacy
Promptness
Precision
Profits**

Automatic Electric Co., Chicago, U. S. A.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Fostoria Electric Supply Co., Fostoria, Ohio.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.

National Battery Co., N. Y. City.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Telephone Apparatus Exchange, Chicago, Ill.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

De Veau Telephone Mfg. Co., New York.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Hipwell Mfg. Co., Allegheny, Pa.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Telephone Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

Bisell Co., The F., Toledo, O.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Telephone Apparatus Exchange, Chicago, Ill.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

De Veau Telephone Mfg. Co., New York.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Hipwell Mfg. Co., Allegheny, Pa.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Leslie, A. C., & Co., Montreal, Can.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.

Cook, Frank B., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

McIntire Co., C., Newark, N. J.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.

Bisell Co., The F., Toledo, O.

Chicago Insulated Wire Co., Chicago, Ill.

Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

National Wire Corporation, New Haven, Conn.

Okonite Co., New York.

Roebbling's Sons Co., John A., Trenton, N. J.

Scovill Mfg. Co., Chicago, Ill.

Spargo, James A., Wire Co., Rome, N. Y.

Standard Underground Cable Co., Pittsburgh, Pa.

WE HELP TO MAKE

A Good
Telephone

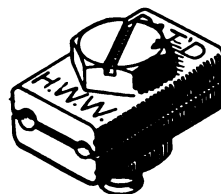


ADDRESS "BARRARM," CLEVELAND

"H. W. W." WIRE-CONNECTORS

are used for making Test-joints in Telephone Wires on Toll or Exchange Lines. Each plate has two grooves of different depths.

By reversal of one plate around the bolt, two wires of the same or of different diameters can be connected.



Simple and effective. Inexpensive and economical. Extensively used by large Telephone Companies. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.



**Experience
is a wise teacher**

**We were taught in
that school.**

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,
170 BROADWAY, NEW YORK. ***Hartford Bldg., Chicago.***

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

4 MOST

4 EVER

Leich

4

Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

OR

MAGNETO

American Electric Telephone Company



**SELECTIVE
IMPEDANCE
COIL**



**CHICAGO
ILL.**



mem

THE AMERICAN TELEPHONE JOURNAL

READ THE
McMeehl.

As 115 is to 66—

So is the *Weekly* paper to the *Monthly*.

During the month of April THE AMERICAN TELEPHONE JOURNAL printed 115 pages of advertising.

Its nearest monthly competitor printed, during this period, only 66 pages of advertising. In the May issue of the same monthly there are only 60 pages of advertising.

Doesn't this show the direction the wind is blowing?

If your ad was in the *Weekly* it reminded the purchaser *five* times in *thirty* days. In the *Monthly* it would have been read *once* in the same time, and would have been forgotten the remaining *twenty-nine* days.

If you are not using the *Weekly* to sell your goods, your wind is blowing the wrong way.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MAY 14, 1904—CHICAGO Number 20

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

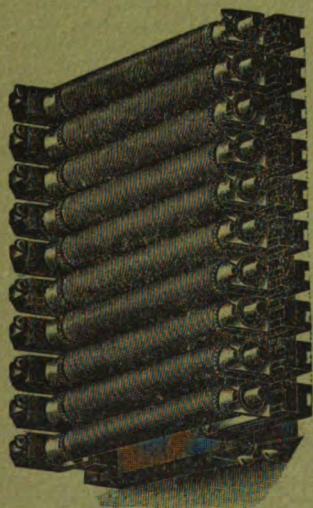
CONTENTS.

EFFICIENCY OF A TELEPHONE POWER PLANT.....By B. D. Willis
SOME REMARKS ON INSTRUMENT SETTING By B. C. Wilhelm
BATTERY LAMP FOR EXAMINING STORAGE CELLS By Otis J. Dorwin
THE RIFLE RANGE TELEPHONE.....By Herbert G. Wiley
A TELEPHONE PRODUCE EXCHANGE PRESIDENT DICKSON ON MESSAGE RATES
SOME FACTS FROM INDIANAPOLIS TELEPHONE OPERATORS IN ROMANCE

The Operating Field:

THE SOUTH BEND HOME COMPANY DECLARES A DIVIDEND TELEPHONE TAXES IN KANSAS
OPERATORS' WAGES RAISED IN CLEVELAND NEW COMPANY FOR EVANSVILLE ORIENTAL TELEPHONY
INDEPENDENT COMPANY FOR OWEGO, N. Y. A NEW TELEPHONE LINE PROTECTOR
SUIT FOR DAMAGES ON ACCOUNT OF SHOCK EXHIBITION OF TELEPHONE MATERIAL AT ST. LOUIS
ONTARIO COMPANY ISSUES CIRCULAR THE FORCE OF HABIT
QUERIES THE EDITOR'S PAGE PATENTS.
THE WEEK'S MESSAGES TRADE NOTES
WANT AND FOR SALE ADVERTISEMENTS, PAGE 320

COOK PROTECTORS STANDARD



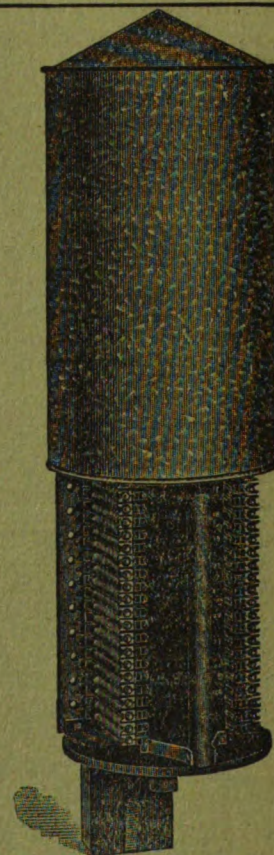
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 31, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF.

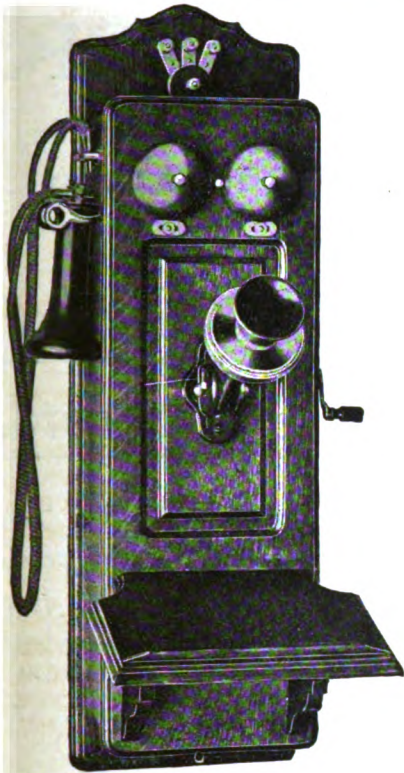
FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.



EXTRA POWERFUL

The No. 36 X-P Type Telephone will do more work than any other telephone ever put upon the market.

It has a 5-magnet generator, 1600 ohm ringer, long lever self-contained hook with platinum contacts, gold electrode button type transmitter, No. 6 Noxem receiver, carbon lightning arrester, and 2 cells 1900 Dry Battery.

GUARANTEE

Equip a line with twenty No. 36 X-P Type Telephones and we will guarantee to ring the twentieth telephone with eighteen receivers off the hook.

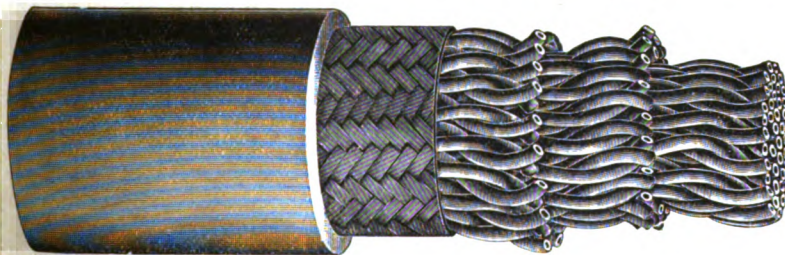
Repair your old telephones. Did you get one of our "telephone parts" bulletins?

ELECTRIC APPLIANCE CO.,

92 and 94 West Van Buren Street

CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.



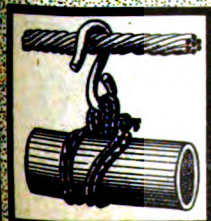
Manufacturers of

"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: :

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

MARLIN CABLE HANGERS



NATIONAL
TELEPHONE
SUPPLY CO.
CLEVELAND

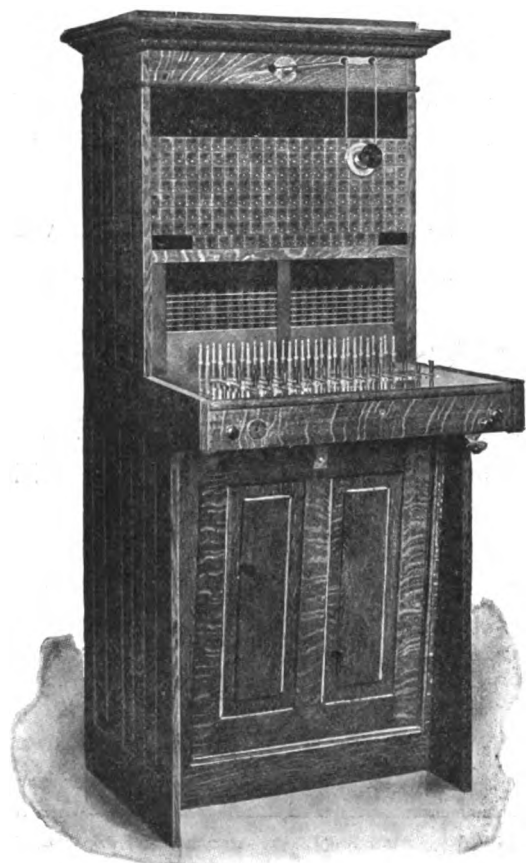
USERS of *Eastern* telephones
are enthusiastic as to their
merits. Ask us for a list of
satisfied customers.

Eastern Telephone Mfg. Co.,
West Chester, Pa.

WHY THEY ARE BETTER

Than any Manually Restored or Mechanically Self-Restored Drop Switchboard.

The Stromberg-Carlson Generator Call Visual Signal Switchboard.



Cabinet No. A-1370, with G-C Visual Signals

Because—They are a faster operating board. The Operator has only a very small space to reach with the plugs, whereas on the self-restoring drop board the operator has to reach over the whole face of the board.

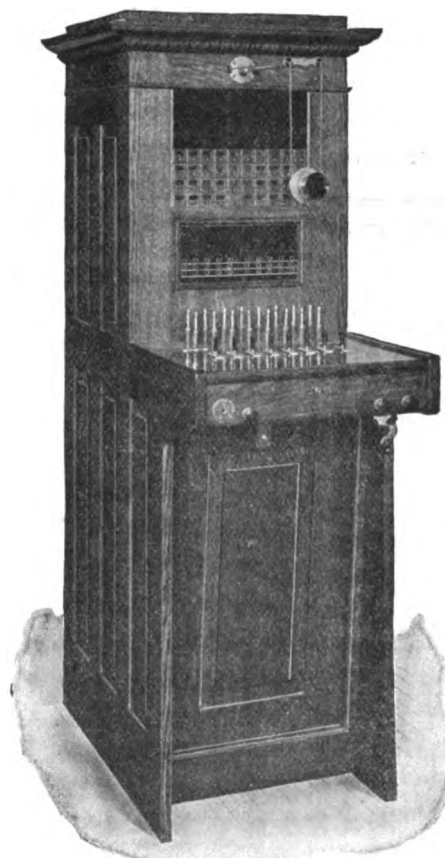
Because—It requires half the number of operators, thus paying greater dividends.

Because—The operator does not have to make a single move that she would not have to make in operating a Central Energy board.

Because—All signals can be restored instantly by pressing a key.

Because—All the working parts are inside of the cabinet and free from dust.

We can refer you to a number of exchanges that have been operating this kind of equipment for a long time. We would like to mail printed matter to all interested parties.



Cabinet No. A-884, with G-C Visual Signals

STROMBERG-CARLSON TELEPHONE MFG. CO.

General and Eastern Sales Office
ROCHESTER, N. Y.

Sales Department
CHICAGO, ILL.

*The Exposition Buildings at St. Louis
will be Equipped with*

KELLOGG TELEPHONES

**The ONLY Telephones
which will be used
at the Exposition.**

Write us for our latest Bulletins, No. 8 and No. 9.
You will find them full of interesting information.

ADDRESS

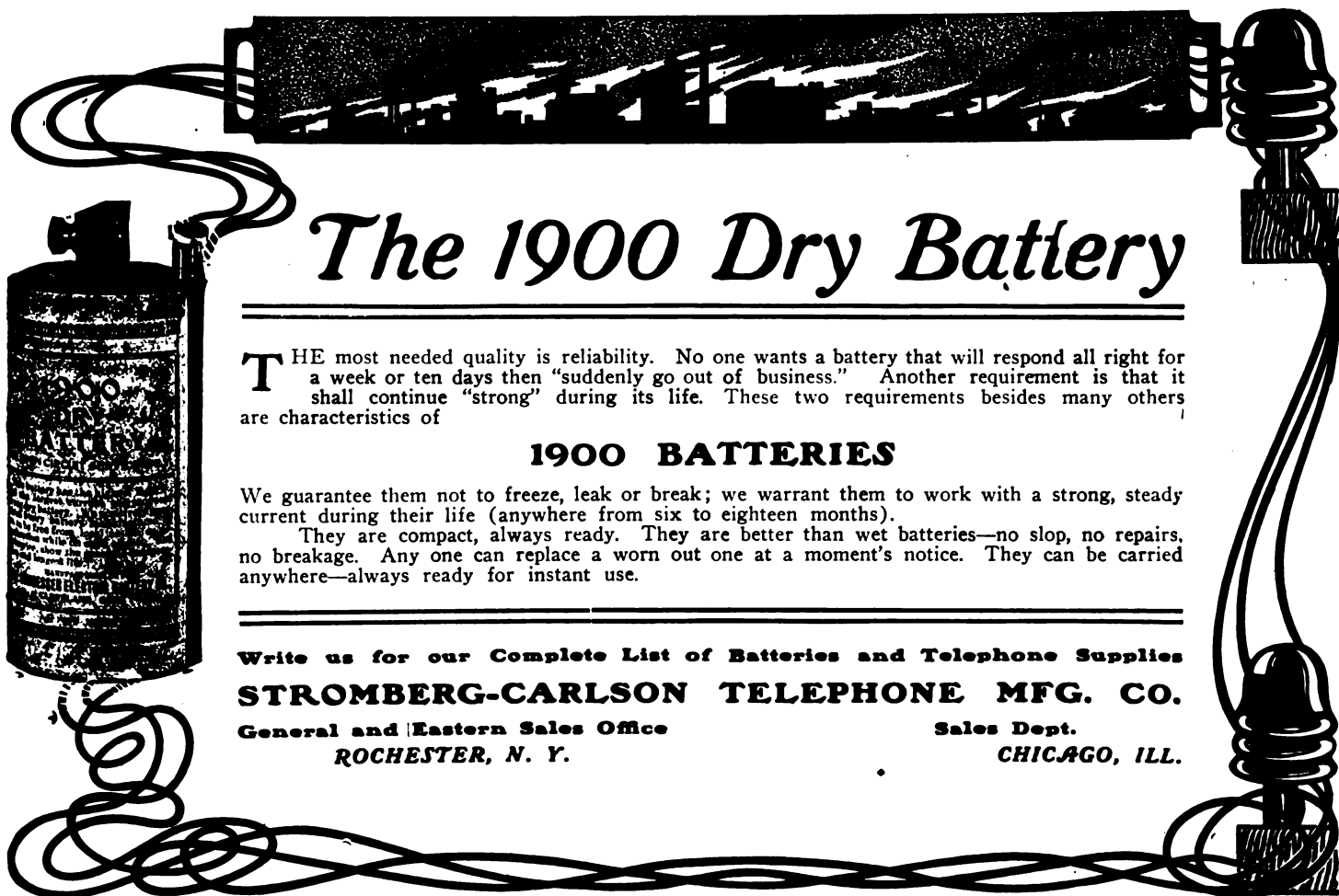
Kellogg Switchboard and Supply Co.,

Green and Congress Streets,

CHICAGO.

**Electric Building,
CLEVELAND.**

**Keystone Telephone Building,
PHILADELPHIA.**



The 1900 Dry Battery

THE most needed quality is reliability. No one wants a battery that will respond all right for a week or ten days then "suddenly go out of business." Another requirement is that it shall continue "strong" during its life. These two requirements besides many others are characteristics of

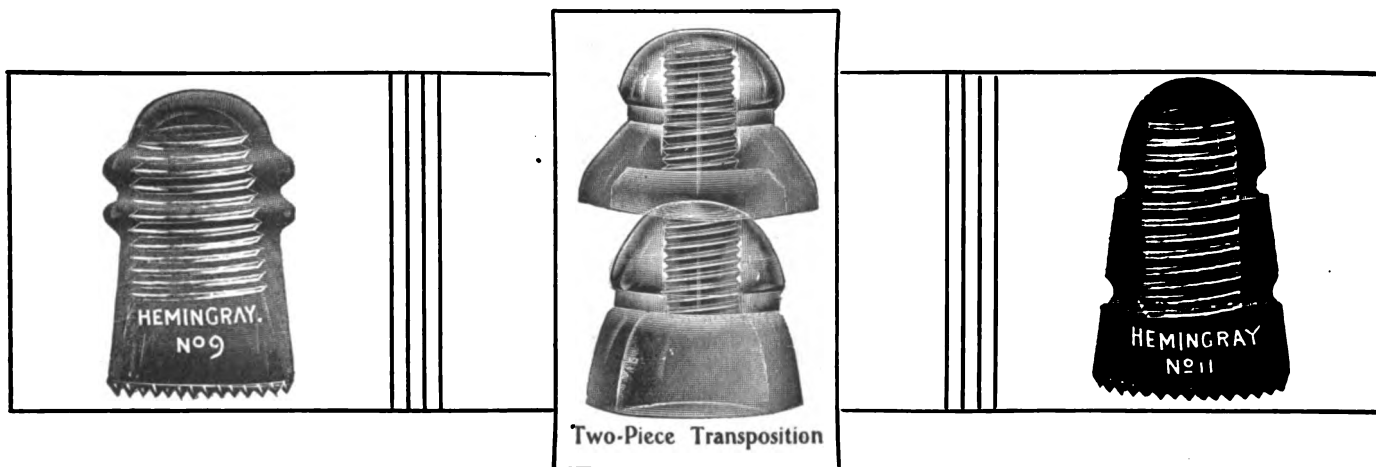
1900 BATTERIES

We guarantee them not to freeze, leak or break; we warrant them to work with a strong, steady current during their life (anywhere from six to eighteen months).
They are compact, always ready. They are better than wet batteries—no slop, no repairs, no breakage. Any one can replace a worn out one at a moment's notice. They can be carried anywhere—always ready for instant use.

Write us for our Complete List of Batteries and Telephone Supplies
STROMBERG-CARLSON TELEPHONE MFG. CO.
 General and Eastern Sales Office Sales Dept.
 ROCHESTER, N. Y. CHICAGO, ILL.

THE STANDARD "HEMINGRAY"

ALL WITH THE "PATENT DRIP PETTICOATS."



THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

Factory, Muncie, Ind.

ESTABLISHED 1848.

The INTERNATIONAL

SELF-RESTORING DROP SWITCHBOARD IS



**Electrically and
Mechanically
Perfect**

For neatness of design,
simplicity of construction,
durability of all
working parts, and for
rapidity of operation,
it has no equal.

**Fully Protected by Letters
Patent. Absolutely Non-
Infringing.**

Write for Quotations and
SAMPLE DROP

**INTERNATIONAL TELEPHONE MFG. CO.
CHICAGO U. S. A.**

We Don't Want to Waste Our Money

in sending out instruments for
installation and trial to those
not in earnest.

BUT WE DO want to con-
vince possible skeptics that all
the virtues we claim for it are
embodied in

THE PENDENT TELEPHONE

So we will send one only, fully
equipped, to exchanges who will
assure us in advance of proper,
prompt and appropriate installa-
tion and a conscientious trial of
thirty days.

Put it where several persons
need access to the 'phone without
interference or interruption and
the best test will be had, though
it is an improvement over other
telephones *wherever installed.*

The Vought-Berger Co.,

Makers of First-award Telephones,
Switchboards and Appliances.

LA CROSSE, WIS.

Reliance Transmitter No. 90



For mounting on woodwork
or adjustable arms



The Button
(actual size)

ORDER ONE TO-DAY

SAMPLE PREPAID

\$1.00

S. H. COUCH CO.

162 PEARL ST., BOSTON, MASS.



DE VEAU TELEPHONES AND APPARATUS

Highest standard
of workmanship
at pleasing
prices.

Ask about our
Testing Set

Lightest, most
compact and
durable made.
120-page illus-
trated catalogue
on request. Let
us send you one.



**De Veau
Telephone
Manufacturing
Company**

27 Rose St., NEW YORK



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



ADDRESS 'BARRARM,' CLEVELAND

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first-class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

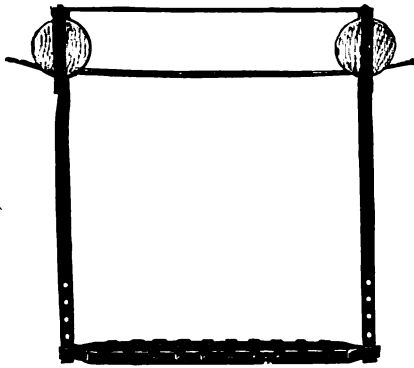
The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.



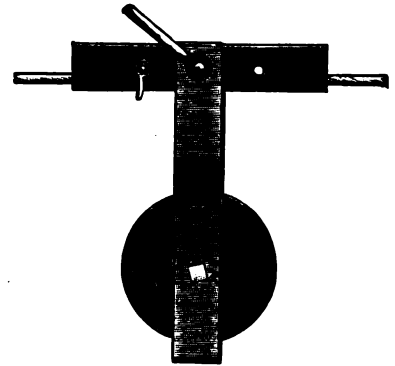
"Ready" Cable Car

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.	36	Hipwell Mfg. Co.	34
American Electric Teleph. Co.	40	Holtzer-Cabot Electric Co.	—
Am. School of Correspondence	—	Imperial Finance & Cons. Co.	34
American Vitriified Conduit Co.	39	Indiana Rubber & Insulated Wire	—
Automatic Electric Co.	10	Co.	3
Barr, W. J., Mfg. Co.	33	Index of the Technical Press	30
Beidler, Francis & Co.	33	Inland Steel Co.	32
Benedict & Burnham Brass & Cop-	12	International Telephone Mfg. Co.	7
per Co.	12	Keeling & Ridge Co.	34
Bissell Co., The F.	12	Kellogg Switchboard & Supply	—
Bullard & McElligott	12	Co.	5
Burnley Battery Co.	33	Klein, Mathias, & Sons	34
Butterfield, J. F.	34	Lanz M., & Sons	12
Cameron Appliance Co.	36	Leslie, A. C., & Co.	—
Camp, The H. B. Co.	39	Lewis Lumber & Mfg. Co.	33
Central Mfg. Co.	31	Lindsley Bros. Co.	32
Central Telephone & Electric Co.	10	McIntire, C., Co.	36
Century Telephone Const. Co.	11	Maltby Lumber Co.	29
Chicago, Burlington & Quincy Ry.	—	Medora Milling Co.	33
Co.	—	Merritt & Co.	12
Chicago Insulated Wire Co.	34	Michigan Cedar Co.	33
Chicago Telephone Apparatus Ex-	34	Middleton, J. W., & Co.	34
change	34	Monarch Telephone Mfg. Co.	8
Chicago Writing Machine Co.	33	Mullen, Frank	33
Churchill, E.	33	Munk, Otto	9
Cohn & Bock	33	Nagel, W. G., Electric Co.	9
Columbia Mfg. Co.	33	National Battery Co.	9
Connecticut Teleph. & Electric Co.	2	National Telephone Supply Co.	3
Cook, Frank B.	2	National Wire Corporation	35
Couch, S. H. Co.	7	New Haven Novelty Machine Co.	8
Crumb, W. H. Co.	8	Nungesser Electric Battery Co.	—
De Veau Tel. Mfg. Co.	7	Okonite Company	—
Dickey Clay Mfg. Co., W. S.	36	Pacific Coast Pole Co.	30
Eastern Telephone Mfg. Co.	3	Pendleton & Gilkey	33
Electric Appliance Co.	3	Pignolet, L. M.	32
Ericsson Telephone Co.	9	Pittsburg Lake Superior Iron Co.	29
Erner Hopkins Co.	34	Prosser & Son, L.	33
Fahnestock Transmitter Co.	—	Roebbing's, John A., Sons Co.	32
Fowler, John H.	29	Sand Point Cedar Co.	30
Garton-Daniels Co.	11	Seovill Mfg. Co.	31
Gest, G. M.	38	Scribner, A. C.	11
Hemingray Glass Co.	6	Spargo, James A., Wire Co.	34

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Genuine Swedish Operators' Receivers

Number 536-A has
Eiderdown pad, and
double spring head
band.

It is very powerful
and durable, and
specially adapted for use
on long, heavily loaded
lines.



No. 536-A.



No. 536.

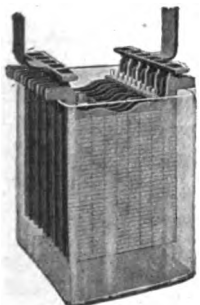
Number 536 has
single spring, leather
covered head band. Is
light, easily adjusted,
and very comfortable.
This, also, can be
used very effectively on
long, loaded lines.

Write for Particulars.

ERICSSON TELEPHONE CO.

"INDEPENDENT"

Mfrs. of Switchboards, Telephones and Telephone Supplies,
Dept. E. 296 Broadway, NEW YORK, N. Y.



STORAGE BATTERIES

UP-TO-DATE TELEPHONE BATTERIES MUST HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

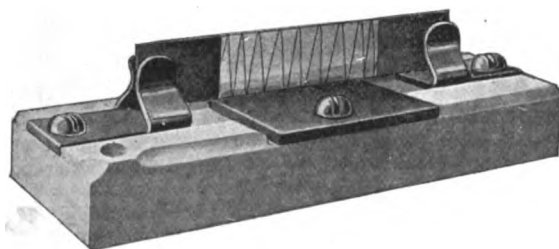
FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

OUR PROTECTORS PROTECT



Our **Protector Line** includes Cable Terminal Heads, Distributing Boards, Cross Connecting Boards and Fuse Blocks.

We manufacture Full Line Telephone Apparatus. We supply "Everything Used With Telephones." Catalogues and Sample Fuse Block free to anyone mentioning this ad.

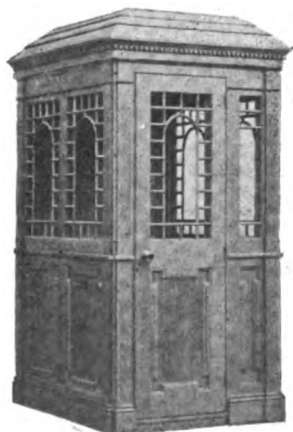
Central Telephone & Electric Co.

909 Market Street

ST. LOUIS, U. S. A.

*Our **Automatic Telephone** installation at the St. Louis Exposition is the most remarkable electro-mechanical exhibit at the big show. You will find it in the Palace of Electricity, section 24. Inside this great palace we have built a little palace. You are cordially invited to call.*

Automatic Electric Company,
CHICAGO, U. S. A.



The two booths pictured here, give an idea of the beauty and attractiveness that it is possible to obtain in Booth construction.

Such booths stand as a temptation to 'phone users everywhere. It's good business to install them freely in town or city. The quicker you are at it, the quicker you are in it.

YESBERA MFG. CO.
TOLEDO, OHIO



We Do Not Infringe

OTHERS' PATENTS

*Our Equipment Covered
by Our Own Patents*



100 LINE LAMP SIGNAL MAGNETO BOARD.

*Common Battery Multiple
Lamp Signal Magneto
Bell Type Tubular Drop
Switchboards for All Services*

Sterling Electric Co.
LAFAYETTE, IND.

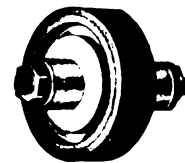
THE G. D. DROP

This extension bell drop works to perfection. It mounts on front of magneto box. Is operated by the movement of the bell clapper. Not connected with telephone circuit in any way. Can't get out of order. Send for sample and pamphlet D6.

GARTON-DANIELS, KEOKUK, IA.

THE CENTURY "Platinum Electrode" Transmitter

Electrode
Surface
Pure
Platinum



FRONT VIEW

Double
Auxiliary
Mica
Diaphragms

Electrodes
Insulated
From
Transmitter
Body



BACK VIEW

Unequalled
for
Quality
of
Transmission

2 VIEWS OF TRANSMITTER CUP

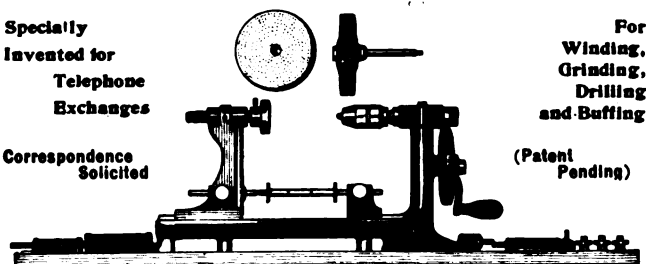
**ALL CENTURY TELEPHONES
Equipped with this Transmitter.**

Century Telephone Construction Co.
536 Ellicott Sq., **BUFFALO, N. Y.**

THE EUREKA COMBINATION BENCH LATHE

Specially
Invented for
Telephone
Exchanges

Correspondence
Solicited



For
Winding,
Grinding,
Drilling
and Buffing

(Patent
Pending)

A. C. SCRIBNER, MFR.,
GLOVERSVILLE, N. Y.

In the Life of a Telephone Lies the **PROFIT THEREOF**

How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO

NEW TRUNKS

ARE NOT AS GOOD AS
EXPANDED

Metal Lockers

FOR YOUR OPERATORS.

A *Safe and Sanitary* place to leave wraps. Increases the efficiency of your Exchange. In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.



M. LANZ & SONS,
PITTSBURGH,
PA.

PLAIN
AND
GALVANIZED

Manufacturers
of

**Telephone and
Telegraph Line Material**



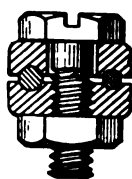
TELEPHONE WIRE TROUBLES

AND THE COST OF CLEARING THEM CAN BE GREATLY REDUCED BY USING

"H. W. W." WIRE-CONNECTORS

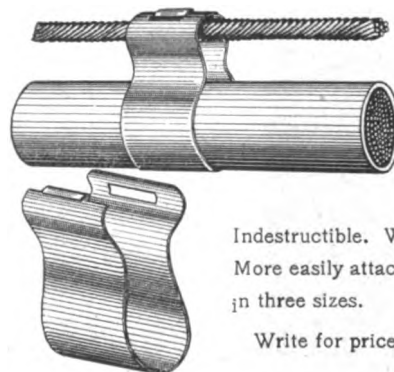


Why make permanent joints at important points in your telephone circuits when a test joint with a thoroughly reliable connector will enable you to test quickly at the cable-box, or at the drop wires—or at intervals on toll wires! The "H. W. W." connector will fit wires of



the same or of different diameters. It has been extensively used by Telephone Companies for several years. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.



**The
Pittsburgh
Cable Clip**

Indestructible. Will not slip on or cut cable. More easily attached than any other. Made in three sizes.

Write for prices and particulars.

BULLARD & McELLIGOTT, . . . **Room 209**
416 Seventh Ave., Pittsburgh, Pa.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MAY 14, 1904

NUMBER 20

A TELEPHONE PRODUCE EXCHANGE

A RURAL produce exchange, established by the Penn Yan, New York, Telephone Company for the use of their patrons, is the latest. There are over two hundred rural subscribers of the Penn Yan Telephone Company, and our representative is informed by A. M. Taylor, the manager of the company at this place, that there are two hundred more telephones contracted for, which will increase the number to over four hundred that are switched at the central at Penn Yan.

Manager Taylor conceived the idea that a general information central would be appreciated by his rural patrons, so in accordance with this idea he installed a large blackboard. To illustrate how it works let us suppose that a party living on the Torrey line has a horse, cow, seed or any other marketable article for sale. He calls up the produce exchange, giving the number of his telephone, and states what he has to sell. This information is placed upon the blackboard.

Now let us suppose that another person residing on the Crosby-Barrington line wishes to purchase something of this kind, and asks the produce exchange who has horses, etc., to sell. He is given the number of the telephone of the party who has such articles as have been inquired for, and then he can call and find what he wants without running all over the country. The farmers will also be able to receive prices on all produce, as each sale will be registered. This idea has been in practical operation but a short while, yet so great has been the demand for space that the blackboard will have to be enlarged. Farmers who formerly wouldn't have anything to do with the new-fangled notion of a telephone, are realizing they are not in the running as it were, when it comes to buying or selling anything quickly, and as a result are now only too anxious to get in a telephone and share the profits to be incurred with the privileges of the Rural Produce Exchange. It is said that in one instance in particular, by means of this exchange, a farmer saved over \$25. He had a large drove of sheep for sale when a buyer came around and offered him a price. Before accepting, however, he called up the exchange to find out if there had been any offers made and learned to his surprise, that the same dealer who was trying to buy from him, had offered another farmer 10 per cent. more. As a result he held out for a higher price, which he was able to get. This is but one case and there are undoubtedly several more, where

a farmer has been able to make more out of his products, in fact, more than enough to pay for his telephone for a year.

Besides the rural lines, the Penn Yan Exchange has over 500 telephones within the town limits. By the end of the year, from present indications, there will be 1,000 subscribers, which will be a remarkable showing for a town of 5,000 inhabitants. The Penn Yan Telephone Company has been in operation a little over a year, and is one of the best equipped and most modern small exchanges in the country. The central station equipment consists of a common battery switchboard with lamp line signals and lamp supervisory signals. There are two positions of one hundred and sixty each for local calls and one position equipped for toll and rural lines. The value of this idea to telephone companies operating in rural districts is apparent. As a time and labor saving device the telephone has gained its

present standing in the commercial world. Why not extend its advantages to the farmer? The country newspaper has until recently, been the farmer's only means of finding out what the outside world has been doing, except by an occasional visit to the city. In consequence he has not felt the need of hurry or more up-to-date news than appeared in the weekly issue of a local paper. The telephone has changed this, and now items of special

interest to him are known as soon as the stock broker knows of the fluctuation of the stock market.

As a consequence, where the farmer formerly waited for the next issue of this local paper to advertise or find out what is for sale, now he wants to find out immediately if there is a market for his goods, and what the prevailing prices are.

It is said the corner in wheat held by Leiter was broken by the farmer's having telephone service, and, in consequence, being able to hold on to their wheat for a much higher price than would have been possible without the aid of the telephone.

What has been done in a small way by the Penn Yan Telephone Company can be elaborated upon, and the produce exchange board be made a feature of the rural telephone system. As a drawing card for service, it is second to none, and should do more to getting farmers as subscribers than any other means it would be possible to employ, since it appeals directly to his welfare in business.

PHONE NO.	PRODUCE	PHONE NO.	PRODUCE	PHONE NO.	PRODUCE
1626	Foot Stakes	12K	Work Beans	2W	2 Bush Cows
17A	New Milk Cow	140	Seed Oats	7B	Wood Shanty
5B	Empire Stakes	13A	Seed Potatoes	20A	Seed Barley
5H	Tomato Plants	15K	Concord Saw	15M	Seed Corn
18A	5 Hives Bees	17B	Jersey Cow	14R	Good Buggy
19B	Wyandott Eggs	19A	Knaps Roots	5A	Boat for Sale

Quotation Board in Penn Yan, N. Y., Telephone Exchange.

THE EFFICIENCY OF TELEPHONE POWER PLANT

BY BERNARD D. WILLIS.

EFFICIENCY is the ratio of the total energy delivered to the plant to the energy delivered by it. Power is usually derived from a commercial electrical circuit or developed by a steam engine, gas engine or water motor installed by the telephone company. It is usual to find commercial electrical circuits delivering either direct current at 110 or 220 volts, or alternating single or multi-phase from which, with the proper transformer, any voltage can be secured. Occasionally electric railway circuits at 500 volts appear, but as underwriter's rules usually prohibit the use of such circuits, and as the voltage that they deliver varies between wide limits they are so undesirable as to be almost excluded from consideration. If both direct and alternating currents supply are available there is nothing to choose provided prices are the same. Direct current motors are somewhat cheaper to install than induction motors, but as the induction motor has no commutator the operating cost is reduced and the cost of installation may be less. Where an opportunity for selection occurs, that supply should be chosen which is the most regular and less subject to interruption. One hundred and ten volt circuits usually operate upon lighting plants, and in smaller towns such circuits are not supplied during daylight hours, hence subjecting the exchange to the inconvenience of charging at night.

The combined efficiency of motor and generator varies with the size of the machine, as there is a certain amount of friction to be overcome, and the friction loss does not increase as rapidly as the output of the machine.

The combined efficiency of motor generators at full rated load will vary from 55 per cent. in machines of 1 k. w. output up to 72 per cent. in machines of 18 k. w. output. The former corresponds to about 75 per cent. efficiency in both motor and generator, and the latter to 85 per cent. in each machine.

Sixty-six per cent. is a fair average for the combined efficiency of motor and generator of 4 k. w., at full-rated load the efficiency decreasing as the load drops off to 50 per cent. at one-third full load.

The efficiency of the storage battery is a quantity which varies with the rate of charge and discharge. This is partially due to the I²R. losses in the cell itself. The internal resistance of the cell bearing a higher ratio to the total circuit resistance when discharging at a high rate—i.e., when the external resistance is lower than when discharging at a low rate.

Certain chemical changes also take place with less loss if allowed to proceed slowly, and spraying and boiling are wastes of energy, although not to be entirely avoided.

Batteries worked at the normal or eight-hour rate or a lower rate of charge or discharge should give a watt efficiency of 80 per cent. and an ampere hour efficiency of about 95 per cent. if the cells are properly taken care of and worked at their highest efficiency.

The combined efficiency of the motor generator being taken at 66 per cent. and of the battery at 80 per cent. gives an efficiency of 52.8 per cent. from primary power to battery terminals exclusive of conductor loss, which may be taken as 2 per cent., bringing the combined efficiency of motor generator battery and leads down to 51.7 per cent.

Battery jars and tanks should be carefully insulated from each other and from the ground, as bad leaks quite frequently occur from faulty erection work and carelessness.

A leak from the lead lining of a wood tank, or from the all metal tank to ground, or from tank to tank, is not only a source of loss of energy, but incurs grave dangers from electrolytic actions.

The lead lining of a cell shows a definite potential difference to the positive and negative elements within the tanks, when the cell is properly insulated, the sum of the potentials being equal to the voltage of the cell. On full charge when the voltage of the

cell stands at 2.1 volts the lead lining of the cell should be 1.4 volts negative to the positive plates and .7 volts positive to the negative plates.

When the voltage of the cell has dropped to 2 volts the lining should be 1.35 volts negative to the positive plates and .65 volts positive to the negative plates.

If grounded the lead lining will be at the same potential as the positive plates in the tank. This is an accurate method of testing for grounded tanks.

Beginning at the grounded end of a storage battery, each succeeding cell adds 2.1 volts to the potential above ground. Hence as the lead lining of the first tank stands at 1.4 volts above ground potential, the second cell will stand at 3.5, the third at 5.6 volts, the fourth at 7.7 volts, and so on to the twentieth at 37.2 volts above ground.

Grounding any one of the metal tank linings will cause a current to flow to earth, the voltage almost immediately dropping to the potential of the positive plates in the cell. Should the ground be left in the cell, the metal will be eaten through by the formation of peroxide. After removing the ground the potentials between metal lining and plates rapidly assume the normal. Fifteen or twenty minutes should be sufficient for complete recovery.

In case of a cross between two tanks current will flow from the tank of higher potential to the lower through the connection, and from the lead lining of the latter through the solution to the negative plates and the lead lining of the latter cell will therefore be destroyed by electrolysis.

The potential of the lining of the cell of higher voltage to the plates within the cell will have changed, but in this case the lining will show zero potential to the negative plates and hence 2.1 volts negative to the positive plates, while in the cell of lower potential the other extreme is reached—i. e., the lining is at the same potential as the positive plates and 2.1 above that of the negative plates. The potential difference between two electrically connected lead lined tanks is therefore 2.1 volts less than the voltage across the outside of the cells.

The potential of a cell should never be allowed to drop below 1.8 volts—in fact, it is better to keep the voltage higher than this as the most efficient work is done by a storage battery between three-quarters charge and full charge.

For charging small batteries it is not uncommon in practice to charge direct from a constant current circuit through incandescent lamps or other dead resistance. The efficiency of this system is very easily determined and will be the ratio of the voltage of the charging current to the voltage of the primary circuit. Charging a 20-cell storage battery then from a

110-volt circuit would be done at an efficiency of $45/110 = 40.2\%$ 220-volt circuit would be done at an efficiency of $45/220 = 20.1\%$

To charge a battery in this manner either from 110- or 220-volt circuit gives an efficiency of about 20 per cent. and about 10 per cent., respectively, excluding the battery efficiency itself. Operating this is an exceedingly uneconomical way of obtaining power, but in the case of a small exchange matters can therefore be so arranged that by the use of 80-volt lamps the lighting of the exchange room can be done with the same lamps as are used as a resistance in charging. By this method there is relatively very little loss of efficiency.

The use of a gas engine, as prime mover, belted to a direct current charging generator gives the following results:

Gas Engines of three horse-power or over will develop a horse-power per hour on one pint of 75° gasoline or 20 cubic feet of coal gas, allowing an efficiency of 75 per cent. for the belted generator, and with gasoline at 15 cents per gallon this figures down to 3 1-3c. per kilowatt hour. With coal gas at \$1 per 1,000 cubic feet the figures are 3 5-9c. per kilowatt hour. Note that these figures are on current at the charging voltage.

Rates charged for electric current vary from 5 cents to 20 cents

per kilowatt hour, depending upon whether competitive plants exist and upon the quantity of electricity which is purchased. At present the Edison companies, particularly in the larger cities, make a sliding scale of prices whereby large consumers can obtain considerable quantities of electricity at exceedingly favorable rates. Taking 10 cents and 12½ cents and 15 cents to represent from any practice, the following table of costs is obtained:

At 15c. per k. w. hour, primary = 22 8/11c. per k. w. hour charging.
At 12½c. per k. w. hour, primary = 19c. per k. w. hour charging.
At 10c. per k. w. hour, primary = 15.1c. per k. w. hour, charging.
Summing up, we have the following data:

ELECTRIC CURRENT PRIMARY.

Motor Generator.	Direct Charging.
Motor Generator Efficiency 66%	110-V.-40-V. Efficiency...40.2%
Battery Efficiency.....80%	Battery .....80%
Leads 2%	Leads 2%
Combination Efficiency...51.7%	Combination Efficiency...31.5%
Cost per k. w. hour charging current at dynamo....	Cost per k. w. hour charging current at dynamo....
22-8/11c. to 15.1c.	37.3c. to 24.8c.

COMBUSTION ENGINE.

Gasoline.	Gas.
Cost per k. w. hr. charging current at dynamo. 3 1-3c.	Cost per k. w. charging current at dynamo....3 5/9c.

From the foregoing, the following conclusions are drawn: Current for the operation of the exchange costs but one-fifth as much when generated with a gas engine dynamo outfit as when transformed from the average commercial circuit by means of a motor generator.

With the ordinary voltages used in telephone exchanges it is seldom advisable to charge direct through a dead resistance to save the first cost of a generating machine.

The motor generator delivers current direct to the switchboard at an efficiency of 66 per cent., while if the current be stored in the batteries and fed by them to the switchboard the efficiency drops to about 52 per cent—a dead loss of 14 per cent.

The practice of floating the batteries is therefore an economical one, as current is being delivered direct to the switchboard from the motor generator and at the same time the battery is charging at a slow rate.

From the standpoint of efficiency only, one battery is better than two.

The battery should be charging during the busiest part of the day, not at night.

The exchange should operate on the battery alone only when the load falls to that point where the motor generator operates at 52 per cent. efficiency or less—that is about one-third full load current.

By charging during the busy hours the motor generator may be operated at its most efficient load and the batteries may be charged and discharged at the most efficient rate—i.e., at the normal rate or less.

Batteries should be of ample capacity and should be worked only between three-quarter charge and full charge. Charging machines should be of such size that they may be worked at full load for at least eight hours each day—i.e., they should not be too large.

Unfortunately all the above conditions cannot be met as it is always necessary to provide for growth of an exchange, and while the capacity of the storage battery may be increased by the addition of plates the motor generator cannot so easily be altered, although it would, without doubt, pay to replace with larger machines every three or four years in case of phenomenal growth.

Turning to the gas engine driven generator we have to start in on the fact that current derived from this source is much cheaper than the transformed commercial electric current, that the ratio of cost is about one to five.

It is difficult to float a storage battery on a telephone system when the charging current is being furnished by a dynamo driven by a gas engine, without causing more or less noise on the lines. Therefore, when a gas engine is used there should be two batteries installed, being charged and discharged alternately.

The 14 per cent. loss does not cut much figure in comparison with the 500 per cent. gain in cost of operation. The first cost of a gas engine is higher than the first cost of a motor.

In exchanges having a gas engine set and motor generator set, the engine should be used as the regular power and the motor generator as a reserve.

It should be borne in mind that the above considers only the question of economical operation, and that there are numerous considerations met with in practice which go to determine the best practice in each case.

SOME REMARKS ON INSTRUMENT SETTING

TOOLS—SKINNING WIRE.

By B. C. WILHELM.

THE instrument setter should be provided with a hammer of special design for use in running house wire. In general this wire is concealed behind picture moulding. For this reason the head of the hammer should be long, so that it may strike a blow behind projecting woodwork. Fig. 1 shows a good design for a hammer with the requisite dimensions. For heavy work, such as fastening porcelain insulators, an ordinary hammer or

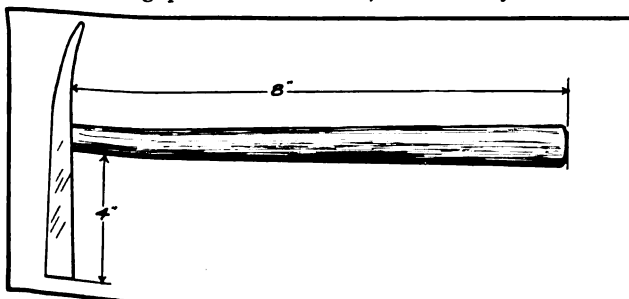


Fig. 1.

hatchet is necessary. To drill holes through plaster, a "star" drill is a very handy tool (Fig. 2). The drill is made of steel and has two cutting edges *a* and *b*, at right angles to each other. For boring holes through wood, a good brace is necessary, and since

it is often required to work in cramped places, one with a ratchet movement is preferred. The most useful bits are extension bits which are large enough to cut a hole 2 inches in diameter and 3 "Syracuse" bits; one ½ inch, one ¾ inch, one 1¼ inch.

For use in soldering, some sort of soldering furnace should be provided. One style known as a "charcoal furnace" consists of a sheet iron cylinder about 12 inches high and 8 inches in diameter. The bottom is elevated about 3 inches above the ground, to provide a draught, and is in the form of a grate. In the front is an



Fig. 2.

opening which can be closed by a sheet iron door. The fuel used is charcoal. To heat the irons, they should be placed in the fire through the doorway, but to keep them hot they may be laid on the top of the furnace. The objection to this kind of furnace is that it takes considerable time to build up a hot fire. A gasoline blow torch of some form overcomes this drawback, preferably one with a hood to protect the flame from wind and a valve

to regulate the air pressure. Besides these tools there should be included in the kit a pair of 8 inch side cutting pliers, a pair of gas pliers, a heavy screw driver and a smaller one for light

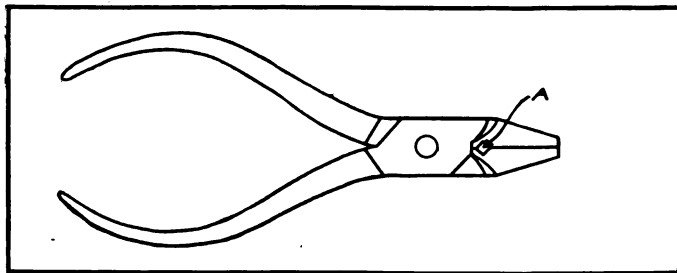


Fig. 3.

work, together with a stout satchel to carry them in, equipped with a strap to go over the shoulder.

SKINNING WIRE.—The main point in removing the insulation

from wire, is to expose a clean surface of metal without nicking or otherwise injuring it. If wire is nicked it is liable to break. To remove insulation from heavy wire, such as that used for the drop line, a sharp knife is best. House wire is best skinned by means of the pliers. To do this properly requires considerable skill, as the first attempts will probably result in cutting the wire. The pliers should be grasped near the cutters. The wire is then introduced, and the cutters closed sufficiently to hold the insulation at the point where it is to be removed. Sufficient pressure is then applied to grasp the insulation firmly and the pliers pulled towards the end of the wire. When properly done the braid and insulation are removed cleanly and without nicking the wire. Some instrument setters make a triangular nick (a, Fig. 3) in each of the cutting blades, so that, when they are closed, an opening is left of sufficient size to allow the wire to pass through. The wire is placed in the cutters directly between the nicks, and the cutters closed completely. The insulation is cut, but the wire remains intact.

PRESIDENT DICKSON ON MESSAGE RATES

IN reply to an interview with Mayor Johnson of Cleveland granted a reporter of the *Cleveland Plain Dealer*, with regard to the proposed message rate schedule of the Cuyahoga Telephone Company, President Fred S. Dickson, of the Cuyahoga company, replied as follows:

HONORABLE TOM L. JOHNSON,
Mayor of Cleveland.

MY DEAR SIR—I have read with interest a reported interview with you in which you refer to a proposed increase of rates by The Cuyahoga Telephone Company, and express a desire to have our right to charge increased rates tested in the courts.

The ordinance to which you refer was passed on February 3, 1896, at the instance of The Home Telephone Company, and provided that the company could not begin operation until six hundred telephones had been installed. This company did not contemplate a development exceeding one thousand telephones in the center of the city, and this was the ultimate capacity provided in both the switchboard and conduits. When The Cuyahoga Telephone Company succeeded to the rights of The Home Telephone Company in 1898, all of the old equipment went into the junk pile, and a new exchange was created with over ten thousand telephones.

Now, an exchange with one thousand telephones and with rates of \$36 and \$46, if intelligently managed, would be a money-making enterprise, but when you increase the number of telephones, thus increasing the value of the service to each subscriber, you must increase rates or you will lose money. You cannot give a subscriber access to ten thousand telephones for the same cost that you can give him one thousand. This is the objection to regulating rates by legislative enactment. If the rates are fair for a small exchange, they will not be sufficient for a large one. It will be therefore necessary, if a legislature is to restrict rates for telephones, to at the same time restrict the increase of business. If the City of Cleveland will agree to restrict its growth a telephone company could, with safety, agree to restrict its charges. I apprehend that we are all striving to increase the population and business of Cleveland, and The Cuyahoga Telephone Company will do its full share in this good work. It is a little singular that an attempt should be made to restrict the rates of The Cuyahoga Telephone Company, while its competitor is to be permitted to regulate its business unrestricted. This seems the more curious when we reflect that The Cuyahoga Telephone Company is owned wholly by Cleveland people, and that more than four hundred of our citizens are interested in its stock, while the stock of our competitor is owned almost exclusively by non-residents, and its profits go to enrich the good people of Massachusetts.

It was realized some months ago that it was desirable that the right of The Cuyahoga Telephone Company to regulate its rates should be passed upon by the courts. The question was, therefore,

raised at Findlay, where a similar state of affairs existed. An action was brought before the Court of Common Pleas, and the court decided in favor of the telephone company. The case was appealed to the Circuit Court, and again the decision was in favor of the telephone company. The court of last resort has now been appealed to, and this case is set down for argument before the Supreme Court of Ohio on May 27th next. The decision of this case will settle the question finally in this State. In view of all this, it hardly seems to me wise to go to further expensive litigation just at this time, as the Supreme Court of the State will doubtless have adjudicated this question before we could gain a hearing before the Common Pleas Court of Cuyahoga County.

You refer in your interview to the fact that we have increased our rates. I prefer to use the word "revised" rather than "increased," as the tendency of our readjustment is, in the main, to decrease rather than increase telephone charges. Thus, in a total of 874 contracts signed since the new rates went into effect, 34, or .0388 per cent., are at the old rates, 126, or 14.41 per cent., are at an increased rate, and 714, or 81.69 per cent., are at a reduced rate. As 425 of these contracts, or nearly 48.4 per cent. of the whole number, are residence telephones, taking rates varying from \$21 to \$24 per year, a reduction of from \$12 to \$15 per year from our franchise rates. The old franchise rates of \$48 and \$36 gave us no latitude whatever. One subscriber might use his telephone 100 times a day and another might use it but ten times, but both paid the same rental. Inevitably, under this system, the poor man was compelled to pay a part of the rich man's telephone bill. This, from every point of view, is inequitable and unjust, and it is for the purpose of correcting this evil that we have readjusted our rates. We propose to put the burden where it belongs.

We will give good service to moderate users for a moderate charge, and those business men who receive satisfactory service and a largely increased number of telephones at their command will not, I am sure, object to paying a fair price for the service rendered.

You will note also that the ordinance in question says nothing about the character of service to be given for the stipulated charge, except that "good service shall be rendered by the company." Herein the citizens of Cleveland were but illy protected. Service which was considered good on February 23, 1896, would not be tolerated to-day. We might use grounded circuits instead of metallic and yet not violate the terms of the ordinance. We might use iron wire instead of copper. We could put one telephone on a pair of wires, or we could put a dozen on the same line, and under the ordinance the city could have no cause to complain. We might still continue to give but six hundred available connections to our customers instead of over ten thousand, and under the ordinance no one would have the right to object. As a matter of fact, if the Municipal Legislature had the power to pass

the ordinance in question, we could not, under the law, be required to give a better service or any more extended service than was contemplated when the rates were laid down, and if we *did* give more service or *better* service than was then contemplated, we would have a right to charge a higher price for such improved and extended service. You will find this doctrine clearly laid down by the Supreme Court of the United States in *Chesapeake and Potomac Telephone Company vs. Manning*, 22 Supreme Court Reporter, page 881.

All I wish to do or hope to do is to give the people of Cleveland the best telephone service possible, to charge reasonable rates for what we give, to pay our honest share of the taxes, and to stop forcing the poor man to pay a part of the rich man's bills.

Very sincerely yours,

FREDERICK S. DICKSON, President.

The outcome of the new rate schedule will be watched with interest by all those interested, since it is apparent that the argument put forth by President Dickson is fair and just.

SOME FACTS FROM INDIANAPOLIS

BELOW are some figures which show the state of affairs in Indianapolis. We have others of even greater magnitude to give later on.

Union decreased during that period; also, notice that in October, 1902, the number of subscribers with both telephones were 2,307, whereas in April, 1904, there were but 1,323 subscribers having

	No. of Subscribers Indianapolis Tel. Co.	No. of Subscribers C. Union Tel. Co.	No. of Subscribers that had both telephones.	No. Ind. Tel. Co. had that the Central Union did not have.	No. Central Union Tel. Co. had that the Ind. Tel. Co. did not have.
October, 1902					
Business	2,307	2,307	1,958	1,350	558
Residence	3,561	4,666	349	2,211	4,108
Total	5,868	6,973	2,307	3,561	4,666
October, 1903.					
Business	3,298	2,560	1,160	2,138	1,400
Residence	3,574	3,958	250	3,324	3,708
Total	6,872	6,518	1,410	5,462	5,108
April, 1904					
Business	3,697	2,378	1,190	2,507	1,188
Residence	4,000	3,964	133	3,867	3,831
Total	7,697	6,342	1,323	6,374	5,019

This shows the actual number of names which have appeared in the last three directories. Note that the subscribers of the Indianapolis Telephone Company, starting with the October, 1902 directory, increased between each issue, whereas the Central

both the Independent and Central Union telephone companies.

When all of these facts are taken into consideration, the results of the comparison show that the Central Union Company is not in the running.

A DIFFERENTIALLY WOUND RING-OFF DROP

By E. G. MILLER.

IN changing over our exchange from single lines to selective ringing party lines, the 2,500 ohm biased ringer type of telephone was decided upon, operated by pulsating current. After getting the switchboard wired for selective keys, we found our ring-off drops were not to be relied upon at all, owing to the very high resistance of the selective lines.

We found that when a single line 80 ohm telephone, A (in Fig. 1), was connected to a party line, B, it was impossible for A to

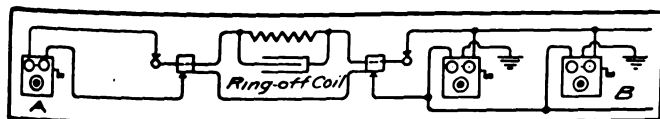


Fig. 1.

ring off, although B could always do so, and if, as is very often the case in starting party lines, there was but one telephone on the party line, then the A telephone was "hung up," and was entirely out of service, if the B telephone forgot to ring off.

Fig. 2 shows the arrangement we adopted to clear up this trouble, and still have a good reliable ring-off under all conditions.

The ring-off coils were rewound with two windings each of 3,500 turns of No. 34 single silk. This gave each winding a resistance of about 120 ohms. A tap was taken from the center of the windings to the sleeve side of the line through a 500 ohm impedance coil.

In operation, if 2 A telephones are connected, each of them rings off principally through the low series pathway of the drop, the bridge through the impedance coil getting little or no current.

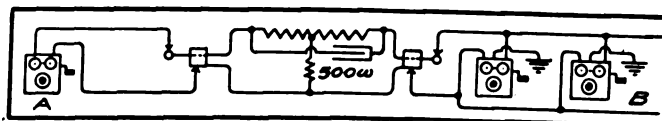


Fig. 2.

In case two B telephones were connected, they would ring off by the bridged pathway almost entirely; and if an A and B telephone was connected, then A rings by way of the bridge, while B would ring through the series pathway. As the different paths are cumulative in effect, it makes a very sure ring-off for magneto work on the mixed lines now so largely used.

BATTERY LAMP FOR EXAMINING STORAGE CELLS

BY OTIS J. DORWIN.

THE proper care of storage batteries requires that the bottom of the tanks or jars containing the plates and electrolyte of each cell be explored to learn if the sediment resulting from detached particles of the active material of the plates has collected in sufficient quantity to short-circuit the plates. This examination should be made at least once a month, and a convenient, if not necessary, implement is a battery lamp.

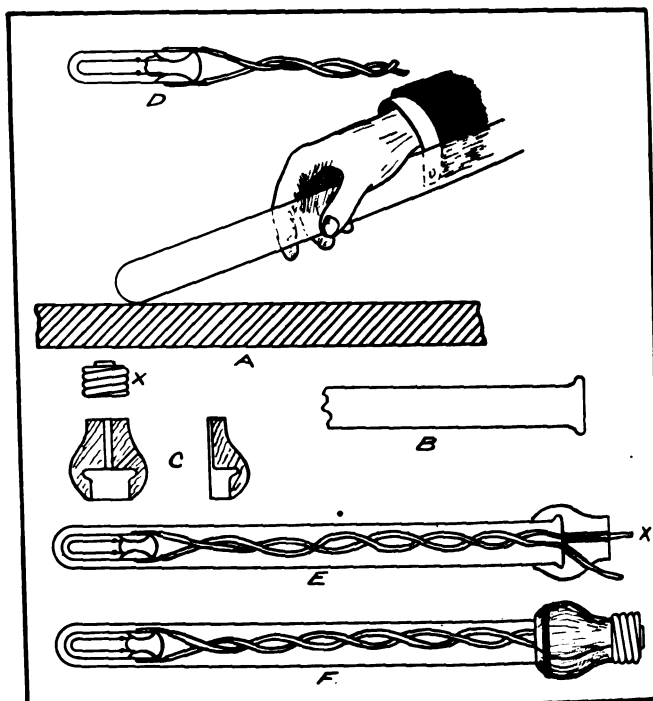
To make a battery lamp is a simple matter if one understands glass blowing, but to those who do not some difficulty may be experienced in closing the lower end of the glass tube, which protects the switchboard lamp from the electrolyte. The writer does not wish to pose as an authority on the manipulation of heated glass, and so merely makes one or two suggestions regarding the closing of the lower end of the tube.

A glass tube, 3 or 4 inches longer than the depth of the tanks or jars, and large enough in inside diameter to admit a switchboard lamp, should first be procured. This tube, if at all moist, should be dried and then slightly heated by holding near, but not in, a flame, so that it will not crack when it is placed in the blaze. A gas stove or jet may be used to heat the tube and about an inch of one end of the latter should be slowly placed in the flame. When the glass reaches a bright red heat, withdraw it and close the end by either rolling it on some hard smooth surface of stone or iron, as shown at *A* in the figure, until the glass has bent in toward the center and closed the tube, or use a pair of long-nose pliers and simply press the hot glass together. The first method makes a neater end, but is more difficult to accomplish.

It is important that the closing of the tube be neatly done so that it will not be larger at the closed end than at any other point. This is to allow of the tube being inserted between the plates of the cell. When a satisfactory closed end has been made the other end of the tube should be heated and then flared out, as shown at *B*. This can be accomplished by turning the heated end of the tube over the pointed end of long-nose pliers.

Next get a piece of soft pine about 2 inches square by 3 inches long, and with a penknife fashion out the handle of the lamp as shown at *C*. The shape of the handle is that of a pear. On the upper end the brass socket part of a burnt-out incandescent lamp is to be fastened by small brads, so this end must be shaped accordingly. Make it slightly tapering and large enough for the brass part to fit snugly. When the outside of the handle has been shaped and sandpapered split it in two exactly in the middle. After splitting, the handle should be hollowed out to receive the flared end of the glass tube. Two small channels should be made for the wires which conduct the current to the lamp. One of these wires passes straight to the top of the screw and the other is to pass out through the side of the handle just below the screw, to which it must be soldered on the lower edge.

A switchboard lamp of the style shown at *D* should be procured, and to it the two wires mentioned are soldered. The lamp should be appropriate for the voltage of the battery, whatever that may be. After the wires have been neatly soldered slide the lamp to the lower end of the glass tube, then put the split handle pieces together around the upper end of the tube. Place the wires in their respective grooves, as at *E*, solder the one marked *X* to the part of the lamp screw base marked *X* at *C*. The joint must be



Drawings Showing Battery Lamp and the Methods of Its Use.

made on the under side. Then force the lamp base over the top of the pear-shaped handle, and after fastening with small brass screws solder the remaining wire to the lower edge of the base.

Make a groove around the lower part of the handle and wrap it tightly with two or three turns of small wire to draw the two parts firmly together. A coat of paint on the handle adds to the appearance.

An ordinary lamp socket should be suspended from the ceiling of the battery room by a piece of lamp cord long enough to enable the battery lamp to be used in any cell, and this lamp socket should be connected to the battery bus bars on the power board. The completed battery lamp is shown at *F* in the figure.

TELEPHONE OPERATORS IN ROMANCE

THERE is something peculiarly attractive about the telephone girl's voice, says an Indianapolis, Ind., daily. Probably because she is unseen and because the voice is mellowed and softened as it comes over the wires. Anyway, it is a voice which frequently soothes an angry patron, and sometimes it goes farther. Sometimes it leads to matrimony. There are many instances in this country of men of wealth who have been attracted to a young woman by the sound of her voice in the telephone receiver. These romances occasionally become public property. One of the most remarkable cases in which a telephone played a prominent part occurred recently in one of the big American

cities when Miss Alice Bermas was married to a millionaire who had fallen in love with her voice over the telephone.

She was a telephone operator, while her two sisters were employed in a cotton factory some miles away. She was of German descent, the youngest daughter of poor people who had emigrated thirty years ago. She possessed a voice of great beauty and flexibility, which became more striking when heard over a long distance telephone. It is to this voice that she owes her present position as wife of the millionaire.

Miss Bermas was frequently called up by a gentleman who, though she had never seen him, became, through familiarity with

his voice, something of an old friend. That he lived many miles away, owned the factory in which her sisters worked, and was immensely wealthy Miss Bermas knew, but otherwise she was ignorant even of the place where he resided. Curiously enough, however, the two sisters knew his house well, and they, with other factory girls, when returning from work would pause outside the gates and occasionally watch the guests arriving in their beautiful carriages, and view with awe the dignified footmen as they paced up and down.

The millionaire, however, cared nothing for this grandeur, and when his wife died some two years ago he bethought him of the telephone girl whose beautiful voice had made so great an impression upon him, traveled down to the town where she was stationed, and called for the avowed purpose of sending a message. He discovered the girl he was in search of, found she was pretty, though by no means beautiful, became acquainted in due time, proposed and was accepted. Not until after the wedding did he disclose his name, and it was only when he took his bride to the magnificent house which had so pleased the factory girls that she began to realize the extent of her husband's wealth. But America is not the only country where telephone romances are found. There is a woman now resident in Liverpool who was wooed and won entirely through the telephone. Her maiden name was Miss Constance Pratt, and for more than a year she was in charge of an exchange office not a hundred miles from Manchester.

Her unfailing good temper, her melodious voice and her musical laugh, which could be heard when she was endeavoring to smooth down a particularly irascible subscriber, must all be credited with

having helped to attract the attention of a wealthy Liverpool merchant. This gentleman, whom we will call Mr. Smith, afterward declared that he used purposely to "blow up" the girl at the exchange in order that he might have the satisfaction of hearing her fly into a rage. But the more he scolded the pleasanter became the voice of Miss Pratt, until Mr. Smith began to think that any one gifted with so remarkably sweet a temper must be a little out of the ordinary, and he pictured to himself the kind of countenance which should go with such an amiable disposition. Finally he determined to satisfy his curiosity, and one afternoon entered the exchange and "interviewed" the woman in charge.

After that visit he called her up on the telephone more frequently, and when not busy Miss Pratt would converse with him for a few minutes, and even indulge in some mild flirtation, though she afterward denied this. In less than three months from the time of calling upon her, during which period they had never again met, Mr. Smith rang the young woman up and offered his hand, heart and \$50,000 per annum, handsomely agreeing that if the "full particulars," with which he would furnish her later, were not satisfactory she would have the option of "returning the goods." Under the conditions Miss Pratt, like a sensible woman, accepted the proposal, and, everything turning out satisfactory, the couple were married two months later. The bride begged that as many as possible of the telephone girls who were with her at the exchange should be invited, a request which her lover readily granted, and it is said that the number of congratulations which were sent by telephone exceeded anything in the memory of the oldest operator.

RIFLE RANGE TELEPHONE

BY HERBERT G. WILEY.

BEFORE the advent of the military telephone it was customary to signal, by means of the regular army code, the scores made by marksmen at a target tournament. The target might be far away from the point where the marksmen and scorers were stationed, and after a shot had been made the signalmen at the target would indicate to the scorers the result



The Telephone Used in Connection With Artillery Practice. The Line Wires Are Seen Laying on the Ground. The Hatchet Makes the Ground Connection.

of it. This was a tedious process and one well calculated to produce errors and to waste time. In artillery practice especially, where the target is miles from the gun, the waste of time has been great. The information as to the effect of a shot had either to be sent back by means of relays, or "wig wagged" with the signal flags.

By the old methods, where intelligence had to be slowly signalled back, the firing of twenty carefully aimed shots and the

reporting of results, occupied about two hours. Where the telephonic method is in use the same amount of practice may be had in forty minutes. It has been found that not only has the target practice been greatly improved in speed by the instantaneous telephone reporting but it is possible to ask and answer many questions, such as, for example, as regarding the explosion of shells, the damage done the target by the various projectiles, etc. Often the report of the striking of a shot is secured before the detonation of the exploding shell at the distant target is heard. The signal corps of the military organizations usually install the lines and instruments over which the reports are transmitted.

For conducting the current one specially prepared insulated wire is laid and the earth is used for a return. If the line is to remain but a short time the conductor is merely laid along the ground, but if it is to be at all permanent, after it has been paid off from the reel wagon, attached to the signal corps, a detail follows along the line and supports it to trees or lays it in protected places. The photograph shows a telephone equipment, such as that described, in use at an artillery target practice. The guns from which the shots are fired are in the distance, to the left, and the scores and judges are in the foreground. The ground at this instrument was made by thrusting a hatchet into the earth and wrapping around it the exposed end of the proper conductor. In the instance illustrated, the targets were about three miles from the guns and the telephone line was installed and ready for service in two hours.

REPLY TO SUGGESTION FOR A GROUND.

MR. J. M. HALL, of Branchport, N. Y., suggests in reply to the query of Mr. J. R. Borden, respecting an unsatisfactory ground, that the trouble is due to a lack of sufficient moisture in the soil rather than to the extremely low temperature. The substitution of a section of ordinary iron gas pipe for the present ground rod is advised. The pipe should be plugged at the lower end with clay or other substance slightly permeable to moisture, and kept partially filled with water. A cork fitted to the opening at the upper end would tend to prevent too rapid evaporation.



THE BEGINNING OF THE END.

IT was with unusual pleasure that the AMERICAN TELEPHONE JOURNAL in last week's issue devoted a page to the decision given by Chancellor Allison, of Tennessee, in the case brought by citizens of Columbia, against the Cumberland Telephone and Telegraph Company. The decision so completely justifies the charges so often made in these columns against the Bell methods of doing business, it is worthy of more than cursory notice. The decision is of especial interest to Independent telephone companies and their friends, for this particular branch of the Bell monopoly, known as the Cumberland company, has been particularly malicious and aggravating in its war on Independent telephony. The gist of the decision was printed last week, but there are certain portions of it that can be repeated without causing any annoyance to telephone operators in the Independent field, who have rubbed up against that kind of unfair competition.

The Cumberland company is charged, in brief, with having discriminated in its charge for service against the citizens of Brownsville and of resorting to a mean trick of leasing the Columbia exchange to an employee in an attempt to evade the law, which in Tennessee is very strict on this subject. If Chancellor Allison, after a thorough investigation of the facts, had not declared this to be true, we should be loath to believe it. The Bell monopoly, taken as a whole, has been guilty of an astonishing lot of mean things during its checkered career. But the Cumberland company, inoculated though it is with the Bell virus! How can it be possible? Is not the president of the company a respectable man? Is not the assistant general manager a psalm singer and a great stickler for a proper observance of the Sabbath? Are not the officials of the company all church men in good standing? Is it to be supposed that they would attend church on Sunday and play the part of hypocrites and of enemies to society during the remainder of the week? Yet this is what the Chancellor would have us believe. These are his exact words:

"All of these facts, established by proof, and circumstances, and the lease contract, satisfies the court that this lease was made in violation of law, *NOT BY MISTAKE*—but for the purpose, if possible, of evading liability under the laws of the State for discriminating in its charge for service; the patent purpose and effort of the defendant being to use one of its directors and assistant general manager in the character of lessee of its exchange at Columbia, to accomplish this end, and at the same time and through the same instrument continue its operations and carry out its purpose, to break down its competitor in Columbia and thereby suppress competition in that city, as it had heretofore suppressed and driven out competition, by similar methods, in Clarksville and Murfreesboro, Tennessee."

The "same methods" alluded to consisted of putting down the charge for service in Columbia and these other towns to fifty cents per month, just half the price charged by the Independent company, something which the public would not object to had not

SUFFICIENT IS A WORD TO THE WISE.

this philanthropic action on the part of the Bell concern been confined to these favored towns. Then, the Chancellor goes on to tell us, these same Sunday school men, having driven the other com-

pany from the field, concluded it was time to pass the contribution box again and put the rates back to the old figure.

These charges are as bad as those which the AMERICAN TELEPHONE JOURNAL has been making so persistently, and this unprejudiced tribunal known as the Chancellor, says they are true. And moreover, after reiterating them he concludes as follows:

"The court holds that defendant has assumed to exercise powers and authority not conferred upon it by the laws of the State of Tennessee, and has forfeited its right to exercise any corporate franchise or power in the State of Tennessee, and that defendant be ousted from the further exercise of any such power or franchise in the State, and that its business be closed and wound up."

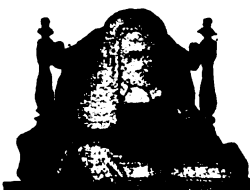
THE AMERICAN TELEPHONE JOURNAL never made out a clearer case and never made a more terrific arraignment of Bell greed and lawlessness than has this court in Tennessee. What are the laws of a State to this monopoly that was conceived in fraud and reared in iniquity? What are the rights of the people to a concern which sees in a public franchise only the right to pillage?

To be sure, there is probably very little hope that the company will be really ousted from the State. The case has been appealed to the Supreme Court and many things can intervene to prevent this being accomplished, although it is "a consummation devoutly to be wished." But the decision will have a wholesome effect. It will open the eyes of the people still further to the pernicious methods of the Bell people in their frantic effort to maintain their monopoly. It ought to open the eyes of Bell stockholders that they are playing a losing game and an expensive one.

This particular law suit was brought against the Cumberland company in 1897, seven years ago. Before the Supreme Court gets through with it seven years more may elapse. But meanwhile telephone affairs in Tennessee have been restored to their normal condition and the public will have had a great object lesson.

Law suits cost money. They are expensive propositions. If the American Telephone and Telegraph Company could have all the money spent by it and its lessees in prosecuting and defending law suits, the run down telephone lines of the company might be rebuilt without borrowing millions of dollars.

A movement that makes such methods seem necessary in order to check it must be truly a formidable movement, and Independent telephony certainly is formidable. It seems to thrive on persecution. Fraud and violence and trickery can not avail. Independent telephony flourishes because the people desire it. They are tired of fraud and extortion and disregard of rights. They would even be willing to see the notorious Cumberland company driven from the confines of Tennessee. There would still be telephones to talk through, for Independent telephony is a power in the land.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

AN UNAUTHORIZED LICENSE FEE.

OUR company is incorporated under an act of the legislature which gives us the right to conduct a telephone line anywhere in the State. The city has passed an ordinance authorizing us to do business on paying a license of \$100. The ordinance provides that if we do not pay the fee our poles shall be torn up and our company excluded from the city. We do not ask for a franchise and do not want it as we claim we can do business without it. Please advise us if you think we are right.

IF you are organized under such a statute as you describe, no franchise is necessary to authorize you to operate in the city. The city is trying to impose upon you and extort money. It has no right to demand that you shall have its permission before operating in the city, and cannot charge you for an unneeded privilege. This is true, assuming that there is no express provision in the city charter authorizing the city to impose the fee it is seeking to levy. *Wisconsin Telegraph Co. vs. Oshkosh (Wis.)*, 21 N. W. 828.

LOCATION OF POLES MUST BE REASONABLE.

IN rebuilding a line, will the law protect the property owner in compelling the setting of a pole at a designated point in a State where a telephone line is held not to be an additional servitude on the highway?

THE property owner cannot designate the point at which a telephone company shall set a pole in front of his property, but he may insist that the pole shall be set so as not to interfere unreasonably with his right of ingress to, and egress from, his property. For example, if there are two possible locations for the pole, one more obstructive of his right of access to his premises and his rights to light and air, than the other, the property owner may insist that the company shall choose the least injurious location, and will be protected by a court of chancery.

STATE LAW AND ABUTTING PROPERTY OWNERS.

IN your last issue, on Indiana law points, you say that there is no law in Indiana allowing telephone companies to build along a country highway without property owner's consent. In this you are mistaken, as we have a law that gives the telephone company an undisturbed right to build along the road.

E. W. S.

THE law editor said that a telephone line appeared to be an additional servitude on a country highway in Indiana.

This is not at all inconsistent with the existence of a law giving telephone companies the right to build along such roads. The latter cuts off any right that township or county boards might otherwise have to object to the building of a line along a rural highway, but would not interfere with the rights of abutting property owners. If, however, our informant means that the rule that a telephone line is not an additional servitude on a city street has been extended to apply to country highways, and can refer us to an Indiana case so holding, we stand corrected. On that point we said "so far as the writer can ascertain."

INJURIES TO SHADE TREES.

THE Indiana courts hold that one who lives abutting on the highway is not injured by the destruction of shade trees unless he owns the soil in which they are planted, and so cannot recover damages therefor. *Western Union Telegraph Co. vs. Krueger*, Ind. 64 N. E. 635. In *Donahue vs. Keystone Gas Company*, 85 N. N. Supp. 478, the Supreme Court of New York holds that a plaintiff who does not own the highway, and has not planted the trees in front of his property can recover for their negligent destruction. The latter decision is said, in 17 Harv. Law Rev. 494, to be an extension of a previous New York case, in which the plaintiff had planted the trees with the sanction of the municipal authorities. *Lane vs. Lamke*, 53 N. Y. App. Div. 395. The note criticises the decision on the ground that shade trees

are merely accidental embellishments, not within the principles of the previously recognized rights of an abutter, the so-called easements of access, light and air. Says the note, "Nor has the plaintiff suffered the special damage necessary to an action arising from the violation of a public right which belongs to him only as a member of the municipality. For the damage must be of the kind recognized in other torts and suffered peculiarly by the plaintiff above the rest of the public as the result of the violation of some legal right besides the public right. See *Metzger vs. Hochrein*, 107 Wis. 267. A familiar example is personal injury from obstructions in a highway. The destruction of property on adjoining land is not a recognized tort."

HOUSE MOVING AN UNREASONABLE USE OF STREET.

THE Supreme Court of North Dakota has upheld the right of telephone companies to be protected from the moving of houses. The Northwestern Telephone Exchange Company holds a franchise from the city of Grand Forks. One Anderson was licensed by the city to move houses and given special permission to move a frame hotel building through the streets. The company secured an injunction to prevent interference with its wires. The injunction was dissolved upon the giving of a bond by Anderson to indemnify the company against damages. The house was moved and suit brought on the bond, the company recovering about two hundred dollars.

The court held that the franchise of the telephone company was a vested right that could not be impaired by subsequent action of the city directly or indirectly annulling it for purposes not public. The use of a street for moving houses is an extraordinary use thereof. Such a use may be permitted but not so as to destroy the use of the street for travel or necessary public purposes. It could not be done in impairment of vested rights such as were held by the telephone company. The judgment for the telephone company was accordingly affirmed. *Northwestern Telephone Exch. Co. v. Anderson*, 98 N. W. 706.

FAILURE TO PERFORM CONDITIONS AVOIDED SUBSCRIPTIONS.

AT Detroit, Mich., Justice Stein has handed down a decision in favor of the defendant in the case of the Co-Operative Telephone Co. vs. Rev. C. L. Arnold. The corporation sued to recover \$40 which they claimed was due them on a share of stock which was purchased by the defendant. Dr. Arnold refused to pay the \$40, claiming that the directors of the company broke the terms of the contract by not installing in his home one of the telephones, and also by amending the by-laws of the corporation, allowing a subscriber more than one share of stock without having been notified that such action was to be taken. Justice Stein held that the contract was not binding. This is the third decision against the company.

NO FRANCHISE FOR OUTSIDE COMPANIES.

JUDGE HEIDLEBAUGH, at Ottawa, Ohio, has refused to grant the Central Union Telephone Company a franchise in the villages of Ottawa and Columbus Grove. Judge Heidlebaugh holds that the right to condemn and appropriate such right of way as given by certain statutes applies only to companies organized under the laws of Ohio, except where it is granted by comity or special legislation. The Central Union Company being organized under the laws of Illinois, and there being no arrangement of comity between the two States, it is held that the telephone company is not entitled to the relief asked.



IN THE OPERATING FIELD.

THE SOUTH BEND HOME COMPANY DECLARES A DIVIDEND.

AT the annual meeting of the directors and stockholders of the South Bend, Ind., Home Telephone Company, a dividend of 2 per cent. was declared. The following officers and directors were elected to serve for the ensuing year: Theodore Thorward, president; Horace G. Miller, vice-president; E. F. Yarnelle, second vice-president; M. B. Staley, treasurer, and E. R. Stoll, secretary. George W. Pixley, M. B. Staley, Theodore Thorward, Elmer R. Stoll, D. D. Bates, Eugene H. Miller, E. F. Yarnelle, Charles T. Lindsey, W. J. Vesey, W. E. Mossman, Horace G. Miller, Charles F. Pfeiffer, E. W. Cook, Charles H. Worden and S. M. Foster.

The company started business in October, 1902, with less than 1,000 subscribers and in six months the list of subscribers had increased to 1,500. In the past year the company's patrons have increased 830, bringing the total number of telephones in the county up to 2,843. Including extension telephones, there are now in use in St. Joseph county 2,927 telephones.

TELEPHONE TAXES IN KANSAS.

THE value of the Kansas telephone lines, for assessment purposes, has been fixed by the State board of railroad, telegraph and telephone assessors. The total value of all telephone property in the State is placed at \$593,805, which is an increase of \$51,000 over the figures for last year. The different companies are graded as follows:

First class—Missouri and Kansas Telephone Company, \$307,653; Interstate, \$221,967; Topeka Independent Company, \$17,911.

Second class—American Independent, \$10,468; Belleville Independent, \$5,376; Brown Telephone Company, Abilene, \$9,953; Central State, \$5,250; Chetopa, \$2,148; Dosbaugh, \$6,450; Downs Western, \$8,497; Elk County, \$3,842; Ellsworth Electric, \$3,275; Exchange, Smith Center, \$5,816; Galena, \$7,011; Great Bend, \$4,884; Hall, \$2,095; Kansas, \$6,408; Lindsborg, \$3,094; Logan, \$1,961; Lyons, \$3,651; McPherson, \$6,352; Newton, \$9,824; Northeast Kansas, \$14,696; Oklahoma & Kansas, \$1,786; Ottawa, \$1,146; Pioneer, \$4,308; Sabethe, \$5,876; Salina, \$14,085; Smith & Flint, \$4,979; Solomon Valley, \$14,041; Southwestern Telephone & Electrical, \$6,824; Wareham Dewey, \$4,891; Wareham & Wood, \$4,026; Wellington, \$6,702; Winfield, \$10,055; Yates Center, \$2,414.

Third class—Altoona Co-operative, \$850; Atwood-Colby, \$413; Bennington, \$2,057; Chester, \$279; Clements & Cedar Point, \$916; Clyde, \$1,241; Courtland, \$1,119; Dolan & Co., \$390; Edmonds, \$1,044; Fancy Creek, \$378; Green, \$674; Hanover, \$1,308; Home Telephone & Electric, \$2,447; Kansas & Colorado, \$1,266; Medicine Lodge, \$2,099; Miltonvale, \$922; Nickerson, \$1,541; Fontana (Cadmus), \$387; Potter Telephone Company, \$2,056; Parallel, \$578; Richardson, \$993; St. Marys, \$1,997; Sims, \$1,510; Springhill, \$1,283; Valley Falls, \$2,076; Vermilion, \$1,837; Wamego, \$990; Wellsville Co-operative, \$3,978; Wetmore, \$1,507; Williamsburg, \$2,107; Wilson, \$1,300; Winchester, \$1,860; Wray, \$2,092.

OPERATORS' WAGES RAISED IN CLEVELAND.

THERE was joy unconfined in the ranks of the operators of the Cuyahoga Telephone Company in Cleveland recently when it was announced that, beginning with the first day of May, the girls would receive an advance of 8 per cent. in their salaries. The advance was all the more welcome because it came without being suspected by the operators.

Cuyahoga operators have been getting from \$25 to \$30 a month, about the salary that obtains in most of the large cities of the country. It has always been the contention of President Dickson that this salary was altogether too low, and he has expressed surprise that girls who had no home in the city could get along on it at all. He has planned from the time when he first took charge

of the affairs of the Cuyahoga Company to do more for the employees of the company as soon as the financial tangle was straightened out.

"I never believed it was right to hold down the wages paid for work because the work is done by girls," said Mr. Dickson recently. "It is a custom which has grown up in this country and is one of the country's great evils. From the first I have looked forward to the time when we would be able to make this advance, for I decided on it when I first saw the payroll. If a girl lives at home she may be able to get along on \$5 a week, but how a girl can pay room rent and board and live and dress herself on that is something that is quite beyond my arithmetic. The work the girls are doing and have been doing is worth better pay, and that we will be able to serve the public better because we pay better wages."

In many respects the relations of the employers and employees of the Cuyahoga Telephone Company would make an interesting study for the student of the great problems that confront wage earners and capitalists to-day. It has never been the principle of President Dickson that work is a commodity worth so much in the market, but that work is something that depends on the worker and that the worker must always be the first consideration

NEW COMPANY FOR EVANSVILLE.

THE Citizens' Telephone Company of Evansville, a new joint stock company, has filed articles of incorporation with the Secretary of State. The amount of the capital stock is \$100,000, divided into shares of \$50 each. The articles declare it to be the purpose of the company to establish, maintain and operate telephone lines and exchanges in the city of Evansville and in the county of Vanderburg, and to connect the same with any telephone lines and exchanges in other places and with long-distance systems. The business of the new corporation will be managed by the following directors: A. F. Karges, M. L. Johnson, M. S. Sontag, A. P. Lahr, D. S. Ragan, Lee Howell, George A. Cunningham, W. J. Wood and Sebastian Henrich.

It is understood that nearly all of the stock is already taken and that a franchise will be granted to the company by the city council in a short time. Last week it was announced that the city authorities had about decided to accept the proposition made by the Cumberland Telephone Company, but subsequent events indicate that the telephone war in Evansville has been renewed and the campaign for supremacy is likely to be more vigorous than ever.

ORIENTAL TELEPHONY.

AN index of the rapidity with which the telephone is spreading even throughout those nations who are so conservative as to use a tree branch for a plough, is given by the report of the recent annual meeting of the Oriental Telephone and Electric Company in London. A chairman read a voluminous report which we condense as follows:

The progress of the company was most noticeable in Egypt, Rangoon, and Singapore, and while the Egyptian business was satisfactory, it is expected that in the future receipts will be larger when a considerable amount of construction, now under way, is completed. In Egypt the company operates exchanges in Cairo, Alexandria and other minor towns, together with a trunk line between Cairo and Alexandria opened last year. This line is constructed and maintained by the Egyptian Government but is leased to the telephone company. Altogether the company con-

trols a wire plant of something like 3,500 miles. In the cities of Calcutta, Bombay, Madras, Rangoon, Moulmein, Singapore and Hong Kong underground conduit plants are being installed so that these cities in the early future will be served by complete and up-to-date telephone installations. The company is operating under franchises extending for various periods from 31 to 60 years. At the conclusion of the meeting the director declared a 6 per cent. dividend upon the preferred stock and a $3\frac{1}{2}$ per cent. on the common stock.

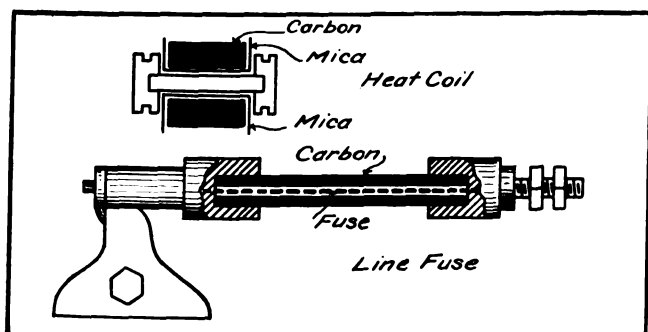
INDEPENDENT COMPANY FOR OWEGO, N. Y.

AN Independent company is attempting to secure a franchise in Owego, for the purpose of putting in an exchange in that town and operating in opposition to the Bell. The petitioners for the franchise are Lyman T. Stanbrough, Ward Decker, Fred Ford and John T. Gorman, of Owego, and Nelson P. Brink, of Binghamton. The board of trustees of Owego will consider the matter at their next meeting. The proposition of the petitioners is to form a stock company within 60 days and begin work. The rates per year promised are for business, private line, \$28; three party line, \$20; residence, private line, \$18; three party line, \$12. The petitioners are preparing a statement to present to the board to show the relative merits of the Independent and Bell companies.

A NEW TELEPHONE LINE PROTECTOR.

By P. KERR HIGGINS.

TO improve upon the protective devices commonly used in telephone installation the writer has devised the protector which is illustrated in the figure, which he believes to be superior, in some respects, to many of the devices now in common use. This protector can be made up in three forms: a standard line fuse, a heat coil, or a protector for terminal boxes. The figure shows two forms that have been in practice. The protector closely resembles in external appearance the commonly known line fuse, but instead of using wood to surround the metal fuse a carbon envelope is adopted. Between the fuse and the carbon a dielectric, either of air, silk, celluloid, or mica, may be employed; the thickness varying with the voltage of the circuit against which the protector is designed to act. The manner of



installing this fuse is essentially the same as that adopted for the line fuse, excepting that the carbon is connected to ground. This design has the advantage that it is practically indestructible for the carbon envelope never decays. Two plans of installing the fuse wire have been tested; by the first method the fuse is hermetically sealed, while by the second a vent hole is arranged by leaving one end comparatively loose. The first method has been found effective, particularly to protect against high tension circuits, as by the explosion of the gas generated by the heat of the blow fuse, the arc is disrupted and the circuit broken. In the latter arrangement there is little possibility of the arc holding, as it is protected by wooden bushings. In either case no damage takes place beyond the injury to the protector. An application for a patent for this device has been filed by the writer.

SUIT FOR DAMAGES ON ACCOUNT OF SHOCK.

ASUIT for \$10,000 damages has been brought against the Cumberland Telephone Company at Evansville, on account of the death of Mabel Meckel who was shocked to death while working at the company's switchboard. The company

is charged with negligence in not providing properly for prevention of over-charges of electricity reaching the interior of the building during a severe electric storm. The suit is regarded as raising a question of great importance, and will be watched by telephone men and employees with great interest.

EXHIBITION OF TELEPHONE MATERIAL AT ST. LOUIS.

BELOW is a list of manufacturers of telephone material and supplies that will exhibit at the Exposition. The list includes manufacturers of all material associated with the construction and operation of a telephone system.

American Carbon & Battery Company, St. Louis; American Electric Fuse Company, Chicago; American School of Correspondence, Chicago; American Telephone & Telegraph Company, Boston; Automatic Electric Company, Chicago; Baird Manufacturing Company, Chicago; The Bristol Company, Waterbury, Conn.; H. B. Camp Company, Chicago; Central Telephone & Electric Company, St. Louis; Chicago Fuse Wire & Manufacturing Company, Chicago; Controller Company of America, St. Louis; Electric Storage Battery Company, Philadelphia; Faller Automatic Telephone Exchange Company, New York; C. J. Field, New York; G. M. Gest, Cincinnati; W. E. Goldesborough, La Fayette, Ind.; Gray Telephone Pay Station Company, Hartford, Conn.; Kester Electrical Manufacturing Company, Chicago; Keystone Electrical Instrument Company, Philadelphia; D. A. Kusel Telephone & Electric Manufacturing Company, St. Louis; The Leclanche Battery Company, New York; McRoy Clay Works, Chicago; W. F. Matthews & Brother, St. Louis; Miller Anchor Company, Norwalk, Ohio; National Carbon Company, Cleveland; National Battery Company, New York; Nungesser Electric Battery Company, Cleveland; Purdue Research Laboratory, La Fayette, Ind.; Queen & Co., Philadelphia; The Safety Insulated Wire & Cable Company, New York; Standard Underground Cable Company, Pittsburg; Sumter Telephone Manufacturing Company, Sumter, S. C.; Telephone Hygienic Company, Los Angeles, Cal.; B. F. Wasson, Clinton, Ill.; Wesco Supply Company, St. Louis; Weston Electrical Instrument Company, Newark, N. J.

ONTARIO COMPANY ISSUES CIRCULAR.

THE Ontario Telephone Company, of Oswego, N. Y., has issued a circular letter to its subscribers soliciting subscriptions to the stock of the concern at \$50 cash per share.

The company proceeds to show how advantageous an investment it is, and gives facts to prove the statements. In Oswego there are nearly 800 patrons and telephone users are asked to subscribe to the stock as the extensions of local and long distance lines calls for additional capital. The company claims that prior to its advent in the field, in 1898, the rates for telephones in offices in Oswego were from \$30 to \$72, and in residences from \$40 to \$60. Based upon these rates the Ontario company claims to have brought an annual saving of \$16,000 and an improved service. The company has paid 6 per cent. dividend on the stock since it was issued and that, with the growth of the service, there is no reason why this rate should not continue. The equipment is new and the service is first class.

THE FORCE OF HABIT.

THE receiver for the defunct get-rich-quick institution was standing bare-headed before the mob that had captured him.

He had a rope about his neck and was talking vigorously, and explaining how he had come to run away with the residue of the concern's money.

The men were impatient, yet they kept still and waited until the man had had his say.

Not that they cared for his speech.

It was force of habit with them.

Some of them had worked for telephone companies and knew, even better than the lay patron knows, that they "should not hang up the receiver until through talking."

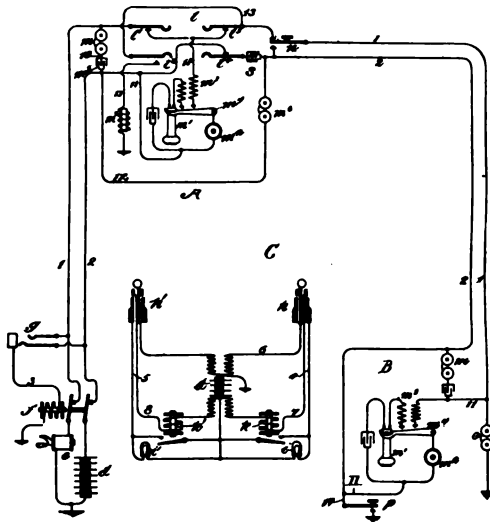
TELEPHONE



PATENTS

IMPROVED CIRCUIT FOR EXTENSION SET.

C. E. Scribner and James L. McQuarrie, of Chicago, Ill., patent (No. 758,703) and assign to the Western Electric Company, an improved substation circuit. This circuit is shown in the accompanying figure, and relates chiefly to such an improvement in the substation circuit as will enable two stations to be installed in such a manner that each station can call the exchange, the exchange can call each station and either station can call the other station. In the figure *A* and *B* are the two stations. Station *A* is equipped with three keys, one at *n*, a section key formed of the springs *l'* and *l''* and the other by the springs *l'* and *l''*.



The station *B* has a key *p*. Normally the circuits are as shown in the diagram and then the exchange can call either station in the usual manner, and, by means of a code ring, the station which is desired is notified. Also when the circuit is in the condition shown in the figure, either station may call the exchange in the usual manner by removing the telephone from the hook. When station *A* wishes to call, the key *n* is closed and the key formed by the springs *l'* and *l''* operated. Under these circumstances station *B* is cut off. Either *A* or *B* can call the other station by means of the key *p* or the spring and contact *l'*. The circuit is so obvious that further description is superfluous.

ESCUTCHEON FOR SUB-STATION SET.

A. C. Christopher, of Chicago, Ill., patents (No. 758,415) an improved escutcheon for sub-station set and assigns to the Kellog Switchboard and Supply Company. The object of this invention is to provide an escutcheon which shall surround the hookswitch so made as to be independent of the cover of the box which encloses the sub-station set mechanism, thus enabling the box to be removed and the set inspected without disturbing the hookswitch.

IMPROVED PARTY LINE SYSTEM.

P. H. Fisk of Clay, Iowa, patents (No. 757,609) an improved party line system. The inventor attempts to provide a small automatic exchange which may be located at different subscribers' stations and enable the subscribers to call any other station selectively. The design is to produce a substation which shall be operative upon a party line without the inconvenience of central office. The device is exceedingly complicated requiring seven pages of drawings and one dozen pages of description. We recommend those interested in the art to procure a copy of the patent.

TELEPHONE REPEATER.

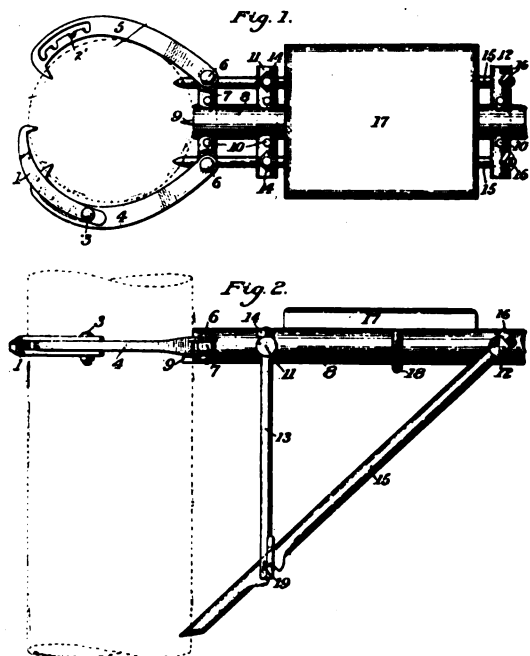
R. A. Engler, Dubuque, Iowa, patents (No. 757,184), a device called a megaplex relay. The essential feature of this invention is a kind of repeating coil which carries the line wire as one winding. In front of the core of the coil an armature is pivoted in the form of a lever, one end of which bears upon the capsule of a microphone. The line impulses vary the magnetism of the core. This varying magnetism causes varying pressure of the capsule, and by this means the microphone repeats from one line to another the impulses which are received.

SELECTIVE SYSTEM.

L. E. Brook, Celina, Ohio, patents (No. 756,824) an improved party line selective system. This invention makes use of the familiar step by step method, requiring a contact wheel at the various substations all wheels being rotated synchronously electromagnetically. Different stations are supplied with contacts upon different notches of the selector wheel, and by this means one station may pick out any desired correspondent from a number of other stations.

TELEPHONE CLIMBER'S SEAT.

J. E. Bennett, of Momence, Ill., patents (No. 758,200) an improved device for linemen. The object of this invention is to provide a portable seat which the lineman may carry strapped to his belt and which he may rapidly and easily attach to the pole when it becomes necessary to make extensive repairs. This invention is shown in the accompanying illustration, which is practically self-explanatory.



tically self-explanatory. A pair of jaws 4 and 5 are arranged to clasp the pole. These jaws are provided with teeth, as shown, which insert themselves into the wood, thus holding the contrivance firmly in position. The seat is carried upon a light structure made of pipes 8, 13 and 16, and supported by means of a tubular brace 15.

ANTISEPTIC MOUTHPIECE FOR TELEPHONES.

H. L. Thompson, of Waterbury, Conn., patents (No. 757,850) an improved antiseptic mouthpiece for telephone transmitters. This consists in providing a hookswitch door, which fits over the transmitter funnel. This door is made of a wire gauze, and this supports the antiseptic system.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



LAMP SIGNAL CIRCUIT GENERATOR CALL 332.

Will you please show me a circuit of a switchboard with line lamp and supervisory signals, with generator at subscriber's set to call exchange? Local battery talking. M. I. C.

Fig. 332 illustrates a grounded (A) and a metallic circuit (B) equipped with lamp signals. When the subscriber calls central by turning the generator crank current passes through the tip side of line through the tip contact in the jack, through the 500-ohm winding of the line relay to ring contact and other side of line, back to the telephone. This will pull up the line relay armature and allow current to flow from the 24-volt battery through the

armatures to restore to their normal position. This also extinguishes the supervisory lamps.

It will be noticed that both the line and supervisory lamps are for 10 volts. At all times, when the lamps are lit, there are resistances in series with them, thus cutting the battery voltage down to the proper amount.

WHY A TELEPHONE BELL RINGS.—(333).

Will you please describe in your query column how it is a telephone bell rings, and why it is called a polarized bell? E. E.

Fig. 333 illustrates the design of a magneto bell. The bell con-

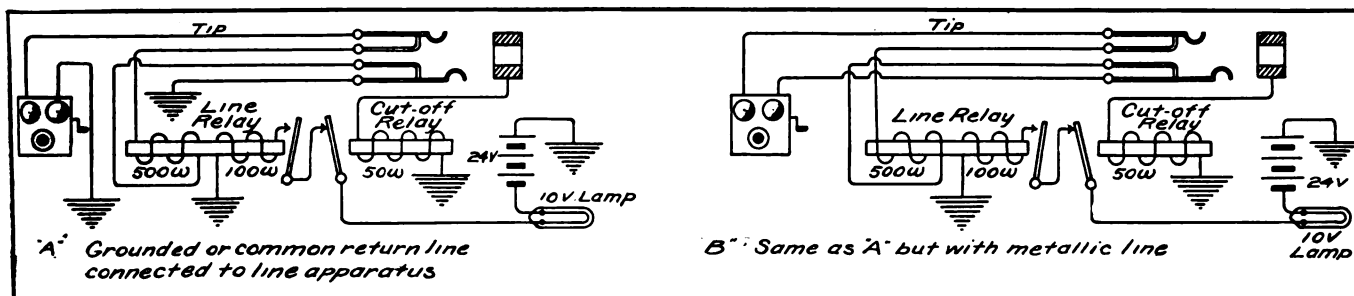


Fig. 332.

10-volt lamp armature of cut-off relay, back contact of same to armature of line relay, through 100-ohm winding of line relay to ground side of battery. The line lamp is thus lit and the current passing through the 100-ohm winding on the line relay locks the same.

When the operator plugs in with the answering cord current flows from the 24-volt battery through the 200-ohm resistance coil, back contact of the answering cord relay, sleeve of plug and jack, through the 50-ohm winding of the cut-off relay to ground side of battery. This operates the cut-off relay and extinguishes the line lamp signal. The inserting of the plug also cuts off the 500-ohm

sists of the two coils, C^1 and C^2 , wound in opposite directions upon the soft iron cores, S and S . There is also a permanent magnet, N . By induction this magnet causes the poles, S and S , to take a one polarity, say, north, while the armature is magnetized in the opposite direction, say, south. When a wave of current from the generator passes through the coils it will increase the magnetism with one of the poles, and as the winding is in the opposite direction

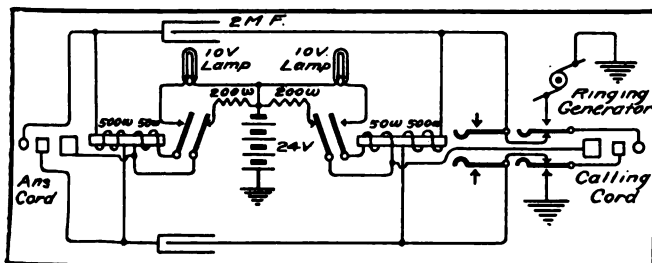


Fig. 332c.

winding of the line relay from the line circuit, leaving the line clear.

When the subscriber rings off current passes through the 500-ohm winding of the cord relay, drawing up its armature, opening the 200-ohm resistance coil circuit and substituting the circuit through the 10-volt supervisory lamp, and 50-ohm winding of the relay. The relay is thus locked in the "up" position and the lamp lit. The cord circuit is shown in Fig. 332c.

The condensers are placed in the tip and sleeve stands of the cord circuit, separating the answering from the calling halves, so that the clearing-out current from one subscriber's stations will not effect both relays. The two condensers in series offer an apparent "ohmic resistance" of about 10,000 ohms to ringing currents, so that not enough current will reach the other half of the cord circuit to operate its relay. Taking down the cords opens the locking circuits at the jacks and allows both cut-off and cord relay

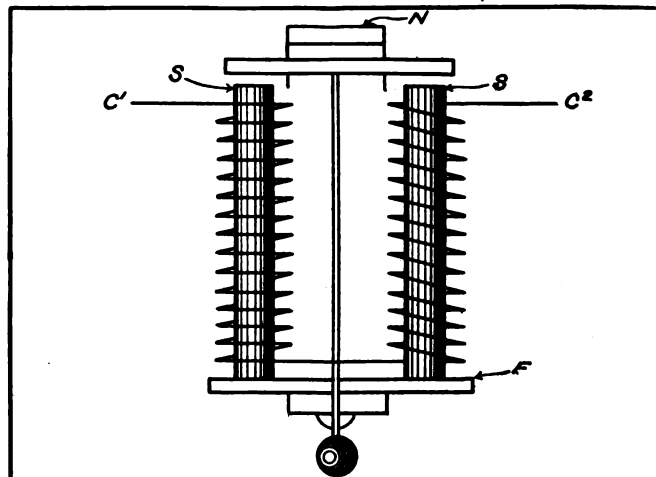


Fig. 333.

upon the other pole, it will affect it in the opposite manner. Hence, the first wave, for example, will tend to operate the armature towards one pole, and as the next wave is in the opposite direction from the first wave, the action upon the bell is reversed, and the armature will be operated in the other direction. Thus with every revolution of the generator crank waves are sent from the line, one of which operates the armature one way and the other in the opposite way. This causes the armature to vibrate to and fro and ring the bell. The bell is called a polarized bell, because the permanent magnet, N , tends to magnetize or polarize both the armature and the cores.



THE WEEK'S MESSAGES

FINANCIAL

NEW BRITAIN, CONN.—The Farmington Valley Telephone Company has paid its sixth semi-annual dividend, at the rate of 6 per cent. per annum.

COVINGTON, GA.—The stockholders of the Stewart Telephone Company have declared a dividend of 25 per cent. The company now has lines in every community of the county and will shortly build to Jackson and Indian Spring.

PRINCETON, IND.—The Princeton Telephone Company has increased its capital stock from \$25,000 to \$40,000. Robert N. Parrett is president.

FLEMINGSBURG, KY.—The Flemingsburg Telephone Company has increased its capital stock from \$25,000 to \$35,000.

HYANNIS, MASS.—At a meeting of the directors of the Cape Cod Telephone Company, a dividend of 6 per cent. was declared. It was voted to increase the capital stock \$3,000. This increased capital stock is to be expended in new construction of lines.

ASHLAND, NEB.—The Ashland Independent Telephone Company has been reorganized with a capital stock of \$50,000, \$14,000 of which will remain as treasury stock. The incorporators are: Herbert H. Herndon, William Shankland and Edgar J. Rose.

SHARON SPRINGS, N. Y.—The Cooperstown, Cherry Valley and Sharon Springs Telephone Company has increased its capital stock from \$5,000 to \$10,000.

BUCYRUS, OHIO.—The board of directors of the Bucyrus Telephone Company have decided to increase the capital stock from \$30,000 to \$65,000.

MT. VERNON, OHIO.—At the meeting of the directors of the Mt. Vernon Telephone Company it was decided to reincorporate the company under the laws of Ohio, and increase the capital stock from \$100,000 to \$150,000. The following officers were elected: Frank L. Beam, Harry C. Devin, W. P. Bogardus, P. S. Kelsner, F. O. Arnold, B. D. Herron, R. G. McClelland, Henry G. Beam, and J. W. Kelsner. The company is now operating 1,603 telephones.

MCDONALD, PA.—At a meeting of the Chartiers Telephone Company, held here, a dividend of 1 1/4 per cent. was declared on the earnings of the last three months.

CORSICANA, TEX.—W. H. Duke is reported to have disposed of his telephone interests in this city.

ORFORDVILLE, WIS.—The Orfordville Telephone Company, by O. P. Goorider, president, and T. E. Tollefsrud, secretary, has increased its capital stock from \$10,000 to \$15,000.

FRANCHISES

OTTAWA, ONT., CANADA.—The telephone committee has recommended that a franchise be granted the Canadian Telephone & Telegraph Company for twenty-one years.

TORONTO, CANADA.—The board of control has decided that a competitive franchise shall be granted a telephone company to do business in Toronto, the company offering the best terms to receive the contract.

WHITE BEAR LAKE, MINN.—The Twin City Telephone Company, of Minneapolis, has been granted a franchise to operate a system in this place.

KANSAS CITY, MO.—The Home Telephone Company, of this city, has been granted a franchise for a twenty year period for Rosedale, Kans. This is the last of the suburbs to give the Home people a franchise, except Harlem, and that territory will be covered at once.

BIG TIMBER, MONT.—A franchise has been granted to the Main and East Boulder Telephone Company to enter Big Timber.

ROCKDALE, N. Y.—The Rockdale Telephone Company will extend its line to Quimby's Central, and will also build another line on both sides of the river. J. B. Powers was elected president.

EL PASO, TEX.—R. V. Bowden, one of the attorneys for the Southern Independent Telephone Company, has been granted a franchise.

STEVENS POINT, WIS.—The city council has granted a franchise for the construction of an independent telephone exchange to Edward Knight. It is his intention to organize a company and commence work at once on the system.

ELECTIONS

GREELEY, COLO.—The Morgan County Independent Telephone Company, at a meeting held here elected the following officers: W. H. Clatworthy, of Fort Morgan, president and director; C. C. Townsend, of Greeley, vice-president and director; R. M. Handy, of Fort Morgan, secretary and director; L. C. Stephenson, Fort Morgan, general manager; Arthur Hotchkiss, Fort Morgan, treasurer. The principal offices of the company were removed from Greeley to Fort Morgan.

WINFIELD, KAN.—The Winfield Telephone Company held a meeting recently and elected the following officers: J. E. Jarvis, Winfield, president; R. V. Montague, Kansas City, vice-president; W. H. Caman, Winfield, secretary, and John F. Hemenway, of New York City, treasurer.

DUNDEE, MICH.—The Monroe County Telephone Company has elected the following officers: J. W. Gradolph, president and general manager; Seth C. Dixon, secretary and treasurer; W. B. Lofler, John J. Dixon and W. F. Gradolph, directors. This company was incorporated one year ago and has increased its subscribers more than 100 per cent. since organization, there being one telephone to each six of the population of the town.

ALBANY, N. Y.—The Albany Home Telephone Company has elected the following officers: Howard Hendricks, president; Irving H. Griswold, vice-president; George C. Lee, Jr., treasurer and H. J. Prince, Jr., secretary.

SCHENECTADY, N. Y.—The Schenectady Home Telephone Company has elected the following officers: Charles F. Veeder, president; I. H. Griswold, vice-president; S. M. Strong, secretary, and E. S. Kellogg, treasurer. The reports submitted by the officers showed that during the year the number of subscribers had increased 100 per cent. and that the demand for stock and bonds is increasing.

PHOENIXVILLE, PA.—The newly organized Mutual Telephone Company has elected the following officers: R. K. S. Allebach, president; Ambler Davis, vice-president; Horace Lloyd, treasurer; William Ellis, secretary. A committee composed of Ambler Davis, Thomas F. Byrne and William Ellis was appointed to purchase the necessary equipment for the construction of a system.

COMBINATIONS

CARTHAGE, ILL.—The Mississippi Valley Telephone Company of Carthage has purchased the Dr. J. G. Young telephone line. Many important changes and improvements will be made. The officers of the company are: O. F. and M. P. Berry and Messrs. Hendricks and Simmons.

BLOOMINGTON, IND.—J. C. Monteith and associates, of Seymour, Ind., have purchased the Bloomington Telephone System. In our issue of April 30th it was stated that this plant had been purchased by the Home Telephone Company, of Louisville, Ky. This was an error.

OLATHE, KAN.—The Olathe Citizens' Telephone Company has been sold to Oscar Ayres, of Gardner, for \$20,000. The officers of the new company are: F. R. Ogg, vice-president; M. G. Miller, treasurer and H. C. Livermore, director. Connection with the Home Telephone Company of Kansas City will be made within the next thirty days.

SLAYTON, MINN.—The Southwestern Minnesota Telephone Company has sold its system in this city to George H. Woodgate.

OSCEOLA, NEB.—The Golden Rod Telephone Company has been sold to a company of men at Ida Grove, Iowa, who will improve and extend the system. The company hereafter will be known as the Polk County Telephone Company. I. M. Shearer is president.

WAKEFIELD, NEB.—The Northwestern Telephone Company has purchased the toll lines of the Sioux City and Black Hills Telephone Company, including the exchange at Hartington.

GUTHRIE, OKLA.—The telephone exchange at Granite has been sold to F. R. Wildman.

PAWNEE, OKLA.—The Pioneer Telephone and Telegraph Company has purchased the toll lines and the exchanges of the J. N. Coulter Construction Company.

PERSONAL

MR. GARRISON BABCOCK, late of the Stromberg-Carlson Telephone Company, has entered the construction field, with headquarters at 38 Rowley street, Rochester, N. Y.

HOWARD I. CRAWFORD has resigned the position of manager and secretary of the Rhinelander Mutual Telephone Company to become manager of the Wausaw (Wis.) Telephone Company.

J. HERON CROSMAN, JR., secretary of the Pennsylvania Telephone Company, will leave in a short time for a visit to Italy and the South of France. Mr. Crosman has not been in the best of health for some time, and his trip will be a vacation. He will be absent about two months.

H. A. DOUGLAS, manager of the Citizens' Telephone Company, Jackson, Mich., has resigned on account of failure in health.

C. M. GARWOOD, formerly of Connellsville, has resigned his position with the Bell Telephone Company to accept a position as superintendent of the Farmers' Mutual Telephone Company, of Washington.

W. S. LEE, who has been traffic manager of the Southern Bell Telephone Company in Columbus, Ga., has been transferred to Augusta. W. S. Holstead succeeds him here.

LEE A. LAUBENSTEIN has succeeded J. Milton Lehigh as manager of the Pennsylvania Telephone Company at Chambersburg, Pa.

MR. S. G. McMEEN was the guest of honor at a banquet given last week by the engineers and heads of departments of the Western Electric Company in Chicago. Mr. McMeen leaves the employ of this company to take up consulting engineering in company with Mr. Kempster B. Miller.

MR. H. W. POPE, of New York, will have charge of the exhibit of the American Telephone and Telegraph Company at the Exposition at St. Louis.

H. B. SANDS, who has been the superintendent of the Ocala (Fla.) Telephone Company for some time past, has resigned and is succeeded by J. L. Bristow, who comes here from Atlanta.

MR. S. P. SHERWIN, president of the Indianapolis Telephone Company, has left for a three months' trip in Europe.

ALFRED SLATER, formerly manager of the Wisconsin Telephone Company in Janesville, and more recently in charge of the large Independent company's plant at Rock Island, has taken charge of the offices of the Beloit Telephone Company in place of J. E. Carr, resigned.

S. C. THAYER, who superintended the building of the plant of the Columbiana County Telephone Company, and later was general manager of the system at Towanda, Bradford County, Pa., is at work on the organization of a company to build a plant at Girard, Ohio.

W. H. WALKER, Fort Worth, Tex., has left for Orange, Tex., where he will be manager of the Southwestern Telephone Exchange.

MR. C. C. VANDENVENTER, of Kingman, Kans., has been elected president of the Southwest Kansas Telephone Association.

MISCELLANEOUS

STERLING, ILL.—The Northwestern Railroad has placed in successful operation a phantom telephone circuit on their quadruplex telegraph lines.

FORT WAYNE, IND.—The Home Telephone Company, of this city, has connected its new exchange at Wallen with its toll lines.

DES MOINES, IA.—The Mutual Telephone Company has accepted plans for a new office building to cost \$30,000.

TILDEN, NEB.—The Tilden Telephone Company is erecting a new exchange and office building.

TOWANDA, N. Y.—The Valley Telephone Company will erect a new exchange and office building here.

UNDERGROUND

MUNCIE, IND.—The Citizens' Telephone Company will pull in 32,000 feet of underground cable and add two additions to their switchboard. The improvements will cost over \$26,000.

AMITYVILLE, L. I., N. Y.—Notice has been given the New York and Long Island Telephone Company to place its wires on Park Avenue underground.

CLEVELAND, OHIO.—The city officials have notified the Cuyahoga Telephone Company that according to the terms of its franchise two miles of wire must be put underground this year.

KNOXVILLE, TENN.—The East Tennessee Telephone Company will put all of its wires in the business section of Knoxville underground. The city council has given the necessary permission.

OGDEN, UTAH.—The Utah Independent Telephone Company is constructing a conduit system here to accommodate 36 cables, each to be of 400 pairs.

NEW COMPANY NOTES.

LEISURE, IND.—The Leisure Telephone Company has been incorporated with a capital of \$3,500. The company will build an exchange and system in Leisure and throughout Madison, Lipton and Grant counties.

NOBLEVILLE, IND.—The Baton Rouge Telephone Company, capital \$2,000, has been incorporated. The company will construct a plant and operate in Hamilton County.

POTWIN, KANS.—The Potwin Mutual Telephone Company has been incorporated with a capital of \$1,500, and will start work at once.

WALSBURG, KANS.—The Riley County Mutual Telephone Company has been incorporated in this city, with a capital of \$1,000. A country telephone line, for rural subscribers, will be built.

OSSEO, MINN.—The Rural Telephone of Osseo, Hennepin County, has been incorporated with a capital of \$50,000. Service will be given to the towns of Osseo, Rogers, Fletcher, Hassan and other smaller towns. The officers are: Elmer Owen, president; H. E. Punt, vice-president; A. P. Hutman, secretary and Henry Berner, treasurer.

CONSTRUCTION

TEXARKANA, ARK.—The New Long Distance Telephone Company has a line in operation from Texarkana to Holly Grove, and contemplate extending it over Arkansas and Texas.

SANTA ROSA, CAL.—The Mark West and Santa Rosa Telephone Company has nearly completed the construction of its plant here.

AURORA, ILL.—The People's Telephone Company is extending its lines and will cover all the country districts in this vicinity.

MAQUON, ILL.—The Maquon and Southwestern Farmers' Telephone Company is extending its lines and reconstructing the present system.

PEORIA, ILL.—The Interstate Independent Telephone and Telegraph Company has resumed the work of constructing its system in this city, which it suspended a year ago last January.

TERRE HAUTE, IND.—The Citizens' Telephone Company is preparing to install 32,000 feet of new cable and make additional improvements at a cost of \$26,000.

WOOLSTOCK, IA.—The Woolstock Telephone Company will extend its line to connect with other towns.

AGRA, KANS.—The People's Telephone Company, which has been incorporated, will at once begin the construction of a telephone plant in this city.

MOUND CITY, KANS.—The Mound City Telephone Company, with a capital of \$4,000, will do a good deal of construction work in this city.

OWENSBURG, KY.—The Home Telephone Company is constructing a system at Owens. This is the fifth exchange in the county for the Home Telephone Company outside of Owensboro, the others being in operation at Stanley, West Louisville, Sorgho and Ensor.

WICHITA, KANS.—The Wichita Telephone Company is rebuilding the toll line between Wichita and Kingman.

BUNKER HILL, MO.—The Lewis County Telephone Company is at work repairing its old lines and putting up new ones here and in the surrounding country. Charles Wagner is superintending the work.

CROOKSTON, MINN.—The Iron Range Telephone Company, in operation in Crookston, will be replaced by a modern plant. It will install a central energy switchboard and rebuild the entire system.

ARMSTRONG, MINN.—The Armstrong Telephone Company will construct a line to Monterey and Triumph this spring. Later in the season the company will construct a line to Ormsby.

NEWMAN GROVE, NEB.—The Newman Grove Telephone Company will extend its lines in this city as well as reconstruct a good deal of its plant.

HUDSON, N. Y.—The Columbia Telephone Company of Hudson, N. Y., has opened their exchange. The equipment is a Sterling central energy board. Trunk lines have been run connecting twenty of the surrounding towns. Sixty thousand feet of underground conduit has been laid and five and a half miles of cable drawn in.

NARROWSBURG, N. Y.—The Big Eddy Telephone Company has begun work on the two new extensions known as the Mountain Telephone Company and the Milleville Telephone Company. A line will be built to White Lake soon.

SODUS, N. Y.—The Wayne-Monroe Telephone Company will be connected with the Ontario Telephone Company.

UNION CENTRE, N. Y.—A trunk line is being constructed to East Newark.

CALDWELL, OHIO.—The Farmers' Telephone Company of this town has opened its exchange and is rapidly nearing the completion of the system.

OKLAHOMA CITY, OKLA.—The Topeka and El Reno Telephone Company will construct a copper metallic circuit from Oklahoma City to Lawton. The company also contemplates the construction of a farmers' line from Chickasha to Anadarko. Various improvements are also being made in the local exchange, which now has 400 telephones connected.

BENTLEYVILLE, PA.—The Home Telephone Company, which was recently organized, has nearly completed plans for the construction of its system, which will, for the present, include only Bentleyville and Ellsworth. Later the lines may be extended to Bealesville and Centerville.

ERIE, PA.—J. E. Colton, superintendent of construction of the United Telephone and Telegraph Company, is in Olean, N. Y., making preliminary arrangements for the new construction.

LOYALSOCKVILLE, PA.—The Loyalsock Telephone Company, which now operates a line from Mountoursville to Warrensville, may extend its line to Ball's Mills.

CLEVELAND, TEX.—The Southwestern Telegraph and Telephone Company has nearly completed its new line to Conroe.

GRANDBURY, TEX.—A new line is being built from here to Lipare, and will form a part of the extensive rural system of Hood County, with headquarters at Granbury.

TEXARKANA, TEX.—The line between here and Paris has been completed and is now in operation.

SOUTH ROYALTON, VT.—The Citizens Telephone Company will be extended to Woodstock this summer.

HARRISON, WASH.—John N. Fisher, manager of the Interstate Telephone Company, states that the company will commence work at once on the construction of a line from Harrison to Spokane.

SNOHOMISH, WASH.—The Skagit County Farmers' Mutual Telephone Company has decided to make this town its permanent headquarters. An exchange building will be erected at once.

THE TELEPHONE A CHEER DISTRIBUTOR.

AN Indianapolis woman's club, discussing the numerous inventions which contribute to the gaiety and comfort of nations, spoke a good word for the telephone as a "cheer distributor." It was held to be an entertaining and agreeable companion, especially in the suburbs. Said one woman: "In the dull winter days, when my husband was in town and the children at school, my spirits would sometimes flag. Instead of flying to a quinine pill or a dose of cut-rate tonic, I would simply go to the telephone, call up some of my much-treasured relatives or intimate friends, either in town or in the country, get a little pleasant sparkle of talk, or harmless gossip, over the wire and go back to my sewing or work refreshed and braced in mind and body. I often administered the telephone cure to my husband and children. If Henry yawned a good deal in the evening and did not seem to care to read or to talk, I would say carelessly: 'Henry, call up George Blanke and ask how they all are over there; we haven't heard from them for several days; or, Henry call up your mother and ask how all the folks are, tell her we want to know.' These little telephone symposiums would brighten Henry up amazingly. When the children were at home from school, with colds, the telephone was our great comfort. I think the world at large is ungenerously silent concerning the countless glorious messages of golden cheer, which, day by day, in every direction, flit along the telephone wires."

BOOK NOTICES.

THE ELECTRIC CLUB JOURNAL.—The May number of the *Electric Club Journal* is an interesting one. Among noticeable articles is one upon "Electric Elevators," by Henry D. James. "The Young Engineer and His Opportunities," by Charles F. Scott and an account of shop tests on a 5,500 k. w. Turbo generator.

THE MAY NUMBER OF THE TECHNICAL WORLD. Published by the American School of Correspondence, Armour Institute, Chicago, Ill.

The third issue of this periodical opens with an extensive account of battleship design, which is followed by a paper on interior illuminations and one upon the American automobile. Engineering notes contains a series of brief accounts of recent engineering features. There are a couple of papers that are timely in view of the approaching season of graduation, indicating the demand for technical men. The latter part of the magazine is occupied by short articles of joints in carpentry, good citizenship, the making of a captain of industry, familiar geometric figures, and practical talks by practical men and an explanation of the method of reading meters of all kinds.

HOW TO WRITE A BUSINESS LETTER. By Charles R. Wiers, Specialist in Correspondence, Buffalo, N. Y. 54 pages. Price, 50 cents.

This book is prepared especially for use in schools, offices, and for general reference in the art of letter writing. It is used as an authority by such firms as Marshall Field & Company, of Chicago, and many others. Mr. Wiers covers the whole subject thoroughly; first, by pointing out the materials necessary for the writing of a good letter, dwelling on neatness, spelling, clearness, brevity, truthfulness, promptness, courtesy, and individuality of letters in general. He even includes such minute details as paging, refer-

ring to former letters, use of figures, signature, folding, mailing and placing of the stamp. Various forms of letters, covering nearly every business situation, are given. These will be found valuable to any firm that has correspondence of any volume whatever. Among the subjects treated are the following: Letters containing enclosures, letters of application, letters of recommendation, complaint letters, dunning letters, letters soliciting trade, letters ordering goods, letters of acknowledgment, letters of endorsement, letters requesting quotations, letters of inquiry, letters containing requests, and miscellaneous letters. The book is written in such a clear style that it will be easily comprehended and very valuable to every one engaged in telephone work.

TRADE NOTES

THE ELECTRIC UTILITIES COMPANY, of New York, is putting on the market a new type of interior telephone, called the Metaphone, to be used in conjunction with bell circuits, and requires no additional wiring.

LEROY W. STANTON, consulting engineer, of Cleveland, Ohio, has issued a pamphlet, profusely illustrated, entitled, "The Dawn of a New Era in the Telephone Field." Descriptions are given of multiple tap aerial cable distributions, and also of plants installed by Mr. Stanton.

THE HOLTZER-CABOT ELECTRIC COMPANY, of Chicago, has gotten up a very attractive souvenir match case, which is aptly described as the "First Frog of Spring." At the present time, when the original idea seems to be at a standstill, it is refreshing to note a decided novelty, such as this is.

THE AMERICAN STEEL AND IRON COMPANY, with offices in all the large cities, has issued a catalogue describing their manufacture of wire ropes and cables, together with fittings. The catalogue deals very efficiently with all the different styles of wire ropes, and has besides an exhaustive treatise on strains, splicing and power transmission.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, of Meriden, Conn., have placed upon the market a new type of test telephone. This is an exact duplicate of the Bell test sets, and is the lightest and most compact form of test set upon the market. This is the only type of its kind that is manufactured by any Independent concern, and it has filled a long felt want. It is also sold at a price which is very reasonable. The company will furnish complete bulletins describing same, on request.

THE STERLING ELECTRIC COMPANY, of La Fayette, Ind., report extraordinary activity in the sales department. Orders have just been received for new switchboards and additions to the present equipment for Eaton, O. (a 500 line tubular drop board); Monticello, Ind.; Brandenburg, Ky.; Mattoon, Ill., and Galena, Kans. Recent large shipments of telephones have been made to Hudson, N. Y.; West Liberty, Ia.; Ridley, Ind.; Ossian, Ind., and four party selective type telephones to Cedar Rapids, Ia.

THE ROEBLING CONSTRUCTION COMPANY, of Trenton, N. J., has gotten up a souvenir of the Baltimore and Iroquois Theater fires. The book is profusely illustrated, and shows in a vivid manner the ravages of the fire upon the so-called fireproof buildings. In all there are 31 full page engravings, illustrating some of the largest office buildings before and after the fire. The findings of the court of inquiry of the Iroquois Theater fire are given in full, together with some suggestions for prevention of similar catastrophes.

THE S. H. COUCH COMPANY, 156 Pearl street, Boston, Mass., report large sales on their "Workrite" button. This concern makes a specialty of interior telephones, and consequently use a great many push buttons. In order to meet the exacting conditions of interior telephone service, they found it necessary to make a button that would work under all conditions, and in the "Workrite" they have secured such a button. The above company is desirous that all contractors should have a sample of this button, and will gladly mail one prepaid to any one who will send two-cent stamps.

THE STANDARD UNDERGROUND CABLE COMPANY, in conjunction with the McRoy Clay Works, have a joint exhibit in Section 3, immediately adjoining the northwest entrance of the Electricity Building, at the St. Louis Exposition. The exhibit shows a cross-section of an actual conduit consisting of seventy-two ducts, with a manhole at either end; one manhole being complete with a cover, the other being open. A trench 7 ft. deep and 5 ft. wide extends the entire length of this conduit, enabling close inspection of the method of laying conduits, including the wrapping, concrete base and top, and the general construction of the manholes, showing hangers, pipes to poles, etc. At one end in the manhole is shown a capstan rigged up for drawing in cables and connected to a cable which is mounted on a reel at the other manhole, the cable being drawn through the ducts and part of the ducts being split, so as to show the method of fastening cables to rope, etc. From the manholes, cables go to distributing poles, showing the method of distribution to aerial cables for telephone, electric light and street railway work with various terminals used to protect the ends of the cable in such work. The McRoy Clay Works show piles of clay as it is dug from the ground and the various processes through which the material goes to produce the finished duct. The Standard Underground Cable Company shows samples in handsome cases of all the various cables and appliances made by it. An examination of this system will show, in very complete detail, the method of installing conduits and drawing cables into completed conduits.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—Very liberal telephone franchise in hustling Western town of 5,000 population. For particulars, address I. S. MAHAN, Le Mars, Iowa. 172

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL.

GILDART BROS., Albion, Mich. 168

WANTED—Second-Hand Telephone Apparatus, Central Energy and Magneto Switchboards, Magneto Bells, Telephones, Transmitters, Cable Terminals, Cross Connecting and Distributing Racks, Ringing and Charging Generators. Write immediately, price, condition and make. "C. E. W.," 17 S. Elizabeth street, Chicago, Ill. 167

IT seems to me that I am the man you are looking for. My specialty is managing small exchanges profitably and satisfactorily. I don't want too much salary. I'd like to send you my references and qualifications anyway. Address, Box 160, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 160

POSITION WANTED—Experienced manager and engineer, desiring to make a change, will be at liberty June 1st. Has built and handled plants up to 10,000 telephones with success. Is fully conversant with all branches of the telephone business and with the most efficient and economical modern methods. Address Box 174, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 174

POSITION WANTED AS MANAGER of an exchange, preferably in the Middle West, of about 500 subscribers or less, by a technically trained young man. Experienced in line construction and management. Thoroughly up-to-date on circuits, rates and duties necessary to make a first-class showing. References. If you are contemplating a change in your management or feel that the system could be run to better advantage, address, Box 179, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 179

RECRUITS desired for Signal Corps U. S. Army. Pay ranges from \$13 to \$90 per month, and in addition rations, quarters, clothing and medical attendance are furnished. The reorganized Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence, and ability, who have had electrical training. For detailed information apply to Chief Signal Officer U. S. Army, Washington, D. C. 177

WANTED—Active telephone men to see and sell new telephone bracket at \$1.50. Desk or wall. Good seller, big commission. Sample, \$1.00 prepaid. PERBIN M. READ, 327 N. 40th St., Philadelphia, Pa. 178

OUR GREAT DIFFICULTY

is in getting telephone men sufficiently interested to write for Prices.

Selling our second and succeeding Pole orders is the least of our troubles.

Won't you write us if you're interested?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Bessemer Building.

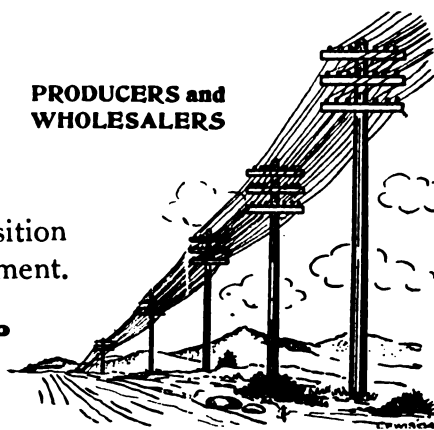
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.



"From the Stump
to the Line."

PRODUCERS and
WHOLESALEERS



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.




LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



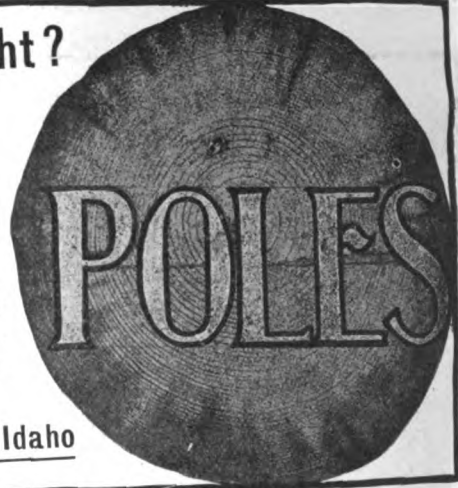
Are You Buying Poles Right?

Are You SURE You ARE?

When in doubt—write us

We are producers on a large scale and have ready for immediate shipment a large stock of all sizes of fine grade Cedar Poles, and the price is strictly right. Ask us for quotations—it may save you many dollars.

Sand Point Cedar Co., Sand Point, Idaho



Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal Articles published by the Engineering Press of the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

The Valentine-Clark Co.

*Begin to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections; concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Standard Underground Cable Co. —	Okonite Co., New York.
Standard Vitrified Conduit Co. . . . 36	Roebbling's Sons Co., John A.,
Stanton, L. W. 34	Trenton, N. J.
Sterling, W. C., & Son. 33	Standard Underground Cable Co.,
Sterling Electric Co. 11	Pittsburg, Pa.
Stromberg-Carlson Telephone Mfg. Co. 4-6	Stromberg-Carlson Tel. Mfg. Co.,
Swedish-American Tel. Co. 12	Chicago, Ill.
Telephone Printing Co. 34	CABLE HANGERS.
Valentine-Clark Co. 30	Bissell Co., The F., Toledo, O.
Vought-Berger Co. 7	Cook, Frank B., Chicago, Ill.
Wanted, Situations, etc. 320	Nagel, W. G., Electric Co., To-
Weston Electrical Instrument Co. 34	ledo, O.
Wisconsin Timber & Land Co. . . . 33	National Telephone Supply Co.,
Worcester, C. H., Co. 29	Cleveland, O.
Yesbera Mfg. Co. 10	Standard Underground Cable Co.,
	Pittsburg, Pa.
ATTORNEYS.	CABLE SLEEVES.
Munk, Otto, New York City.	Nagel, W. G., Electric Co., To-
BATTERIES.	ledo, O.
Burnley Battery Co., Painesville, Ohio.	New Haven Novelty Machine Co.,
Electric Appliance Co., Chicago, Ill.	New Haven, Conn.
Nungesser Electric Battery Co., Cleveland, O.	CARD INDEX SYSTEMS.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	Telephone Printing Co., Defiance, Ohio.
BLANKS, BOOKS AND FORMS.	CIRCUIT CLOSERS.
Telephone Printing Co., Defiance, Ohio.	Garton-Daniels Co., Keokuk, Ia.
BONDS.	CLIMBERS.
J. W. Middleton & Co., Chicago, Ill.	Klein & Sons, Mathias, Chicago, Ill.
BRASS.	Nagel, W. G., Electric Co., To-
Benedict & Burnham Brass & Copper Co., Chicago, Ill.	ledo, O.
Scovill Mfg. Co., Chicago, Ill.	CONDUITS.
BOOTHES.	American Conduit Co., Chicago, Ill.
Yesbera Mfg. Co., Toledo, O.	American Vitrified Conduit Co.,
CABLES.	New York.
American Electric Tel. Co., Chicago, Ill.	Camp Co., The H. B., New York.
Bissell Co., The F., Toledo, O.	Gest, G. M., Cincinnati, O.
Chicago Insulated Wire Co., Chicago, Ill.	Nagel, W. G., Electric Co., To-
Kellogg Switchboard & Supply Co., Chicago, Ill.	ledo, O.
Nagel, W. G., Electric Co., Toledo, O.	Standard Vitrified Conduit Co.,
National Wire Corporation, New Haven, Conn.	New York.
	W. S. Dickey Clay Mfg. Co.,
	Kansas City, Mo.
	CONNECTORS.
	Benedict & Burnham Brass & Copper Co., Chicago, Ill.
	Cook, Frank B., Chicago, Ill.
	McIntire Co., C., Newark, N. J.
	Nagel, W. G., Electric Co., To-
	ledo, O.

CONTINUED ON PAGE 31.

LOW PINE CROSS ARMS

WE MAKE 'EM

AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	26		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	26 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.

CHATTANOOGA, TENN., U. S. A.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

ADVERTISERS' DIRECTORY—Continued

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Erner Hopkins Co., Columbus, O.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS and CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LATHES.

Scribner, A. C., Gloversville, N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

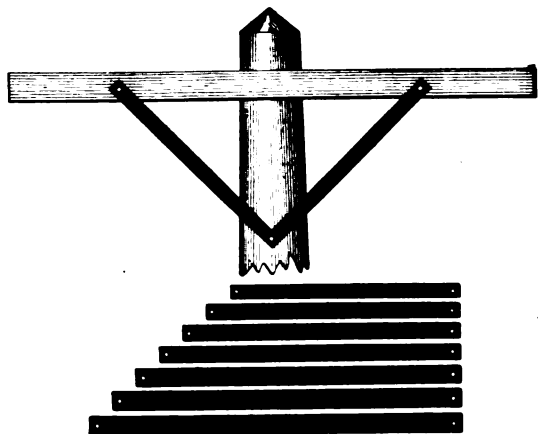
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Elkin Machine Co., Elkin, N. C.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

THE STEEL MADE AND ALL THE
WORK DONE AT OUR OWN PLANT.

All Sizes

Quick Shipment

Plain and Galvanized

INLAND STEEL COMPANY

FIRST NAT'L BANK BLDG.

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

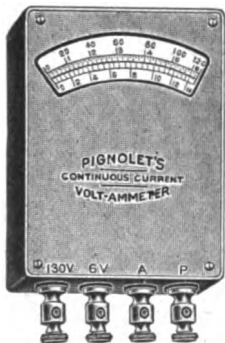
MICHIGAN

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

GEBAR POLES AND POSTS

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

WISCONSIN TIMBER & LAND CO., MATTOON WIS.

Pendleton & Gilkey

816 Lumber Exchange,
Minneapolis, Minn.

POLE PRODUCERS.

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

Cost of Construction Reduced

By Purchasing Chestnut Telephone

POLES and POSTS

From FRANK MULLEN, Ewing, IND.

Reasons Why for the Asking

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices.

Prompt Dispatch

Good Quality...

LARGE SIZES OF

CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES

For Special Use Carried in Full Stocks and Sold at Reasonable Prices

THE MEDORA MILLING CO.,
MEDORA, INDIANA

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

PINS--BRACKETS

Let us send you a few reasons why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG, INDIANA.

E. CHURCHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:

Menominee, Mich.
Escanaba, " Minn.
Cloquet, " Mont.
Heron, " Idaho.
Cabinet, " Ill.
Chicago, Ill.

FRANCIS
BEIDLER
& CO.
459-519 W. 22d St.
CHICAGO, ILL.

AMERICAN TELEPHONE JOURNAL

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

Do you always mention the

**American
Telephone
Journal**

when writing to advertisers?
It will be appreciated by all
concerned if you do.

SPECIAL CROSS ARMS


ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART, cross ties, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly. R. R. AKERS, Manager.

LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

HIPWELL MANUFACTURING COMPANY, ALLEGHENY, PA. High Grade Long Distance Telephones

23 Years' Experience Guarantees Satisfaction.
WRITE YOUR WANTS TO
CHICAGO
Telephone Apparatus Exchange
TELEPHONE ACCESSORIES
BOUGHT, SOLD AND EXCHANGED
17 S. Elizabeth Street, CHICAGO, ILL.

The Erner Hopkins Co. Wholesale
Electrical
Supplies
WRITE US FOR PRICES. WE CAN SAVE YOU MONEY.
The ERNER HOPKINS CO., COLUMBUS, OHIO.

 **J. W. Middleton & Co.**
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
ROME, N. Y.
Chicago Office: 1501 Menadnock Bldg.,
CHICAGO.

Do you always mention the
American Telephone Journal
when writing to advertisers? It will be
appreciated by all concerned if you do.

Keeling & Ridge Co.
General Contractors
Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.
Twenty-first and Sidney Streets,
PITTSBURGH, PA.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.
Main Offices, 551-2-3 The Spitzer, TOLEDO, OHIO.
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

BUTTERFIELD, J. F.
ELECTRICAL ENGINEER
AND CONTRACTOR
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Chicago Insulated Wire Co.
Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

Blank Books and Forms
FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING. ❖ ❖ ❖

Toll Tickets	Receipts for Toll Service
Toll Station Journals	Receipts for Exchange
Toll Station Ledgers	Service
Monthly Check Reports	Lease Records
	Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

WESTON STANDARD
PORTABLE
DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—B. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Tell the Advertiser you saw his
announcement in

**The American
Telephone Journal.**

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.



National WIRES

EXTRA DOUBLE GALVANIZED

For Telegraph and Telephone Work

Wire Rope and Wire Strand
IRON AND STEEL Special Wire FOR EVERY PURPOSE

THE NATIONAL WIRE CORPORATION

NEW HAVEN, CONN.

SALES OFFICES:

NEW YORK	CHICAGO	BOSTON	DE KALB
KANSAS CITY	NEW HAVEN	SAN FRANCISCO	

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects. Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

<input type="checkbox"/> A B C of the Telephone.....\$1.00 By J. E. Homans.	<input type="checkbox"/> The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
<input type="checkbox"/> Diagrams of Electrical Connections..... .50	<input type="checkbox"/> Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
<input type="checkbox"/> Induction Coils.....\$1.00 By H. S. Norrie.	<input type="checkbox"/> Practical Electrica. This volume could rightly be called an Electric Encyclopedia..... .75
<input type="checkbox"/> Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	<input type="checkbox"/> Systematic Treatise on Electrical Measurements..... By H. C. Parker.
<input type="checkbox"/> Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	<input type="checkbox"/> Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
<input type="checkbox"/> Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	<input type="checkbox"/> Electrical Catechism.....\$2.00 By George D. Shepardson.
<input type="checkbox"/> Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	<input type="checkbox"/> American Telephone Practice.....\$3.00 By Kempster B. Miller.
<input type="checkbox"/> The Electric Telephone.....\$6.00 By G. B. Prescott.	<input type="checkbox"/> How to Make and Use the Telephone.....\$1.00 By George H. Cary.
<input type="checkbox"/> The Inspector and Troubleman.....\$1.00 By A. E. Dobbs.	<input type="checkbox"/> The Telephone..... .50 By Prof. A. E. Dolbear.
<input type="checkbox"/> Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	<input type="checkbox"/> The Telephone, the Microphone and the Phonograph..... By Count Dumencl.
<input type="checkbox"/> Practical Features of Telephone Work..... .75 By A. E. Dobbs.	<input type="checkbox"/> Practical Information for Telephonists..... By T. D. Lockwood.
<input type="checkbox"/> The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	<input type="checkbox"/> Elementary Treatise on Electric Batteries.....\$2.50 By A. Niandet. Translated by L. M. Fishback.
<input type="checkbox"/> Small Accumulators..... .50 By Percival Marshall.	<input type="checkbox"/> Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
<input type="checkbox"/> The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	<input type="checkbox"/> Conduits for Telephone Work..... By Arthur Vaughan Abbott.
<input type="checkbox"/> Induction Coils.....\$1.00 By G. E. Bonney.	<input type="checkbox"/> Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
<input type="checkbox"/> Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	<input type="checkbox"/> Patents and How to Make Money Out of Them.....\$1.25 By W. B. Hutchinson.
<input type="checkbox"/> Electric Instrument Making for Amateurs..... .50 By S. R. Bottone.	<input type="checkbox"/> Wireless Telegraphy.....In Press. By C. H. Sewall.
<input type="checkbox"/> Telephone Troubles and How to Find Them..... .25 By W. H. Hyde and J. H. McManman.	<input type="checkbox"/> A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
<input type="checkbox"/> The Telephone.....\$1.00 By William J. Hopkins.	<input type="checkbox"/> A Practical Guide to the Testing of Insulated Wires and Cables.....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal 116 Nassau Street,
CITY OF NEW YORK

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*



*Single or
Multiple Duct.*

**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

Send for Sample of our

\$3.50 HOUSELINE Cable Clip

It LOOKS as good, and WHEN NEW tests nearly as well as our Standard Article and is better than many offered by irresponsible infringers of our Patent at higher prices.

Cameron Appliance Company
89 STATE STREET, BOSTON, MASS.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

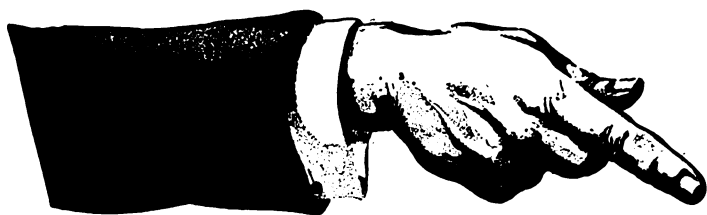
Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____

State _____
American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Fostoria Electric Supply Co., Fostoria, Ohio.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STEEL.

Lealie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.

National Battery Co., N. Y. City.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Telephone Apparatus Exchange, Chicago, Ill.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

De Veau Telephone Mfg. Co., New York.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Hipwell Mfg. Co., Allegheny, Pa.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Telephone Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.

Automatic Electric Co., Chicago, Ill.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

Bissell Co., The F., Toledo, O.

Central Tel. & Elect. Co., St. Louis, Mo.

Century Telephone Const. Co., Buffalo, N. Y.

Chicago Telephone Apparatus Exchange, Chicago, Ill.

Chicago Writing Machine Co., Chicago, Ill.

Connecticut Telephone & Electric Co., Meriden, Conn.

Couch, S. H., Co., Boston, Mass.

De Veau Telephone Mfg. Co., New York.

Eastern Tel. Mfg. Co., W. Chester, Pa.

Electric Appliance Co., Chicago, Ill.

Ericsson Telephone Co., N. Y.

Fahnestock Transmitter Co., New York.

Hipwell Mfg. Co., Allegheny, Pa.

Holtzer-Cabot Electric Co., Chicago, Ill.

International Telephone Mfg. Co., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Lealie, A. C., & Co., Montreal, Can.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.

Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.

Cook, Frank B., Chicago, Ill.

Kellogg Switchboard & Supply Co., Chicago, Ill.

McIntire Co., C., Newark, N. J.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.

Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.

Chicago Insulated Wire Co., Chicago, Ill.

Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.

Kellogg Switchboard & Supply Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

National Wire Corporation, New Haven, Conn.

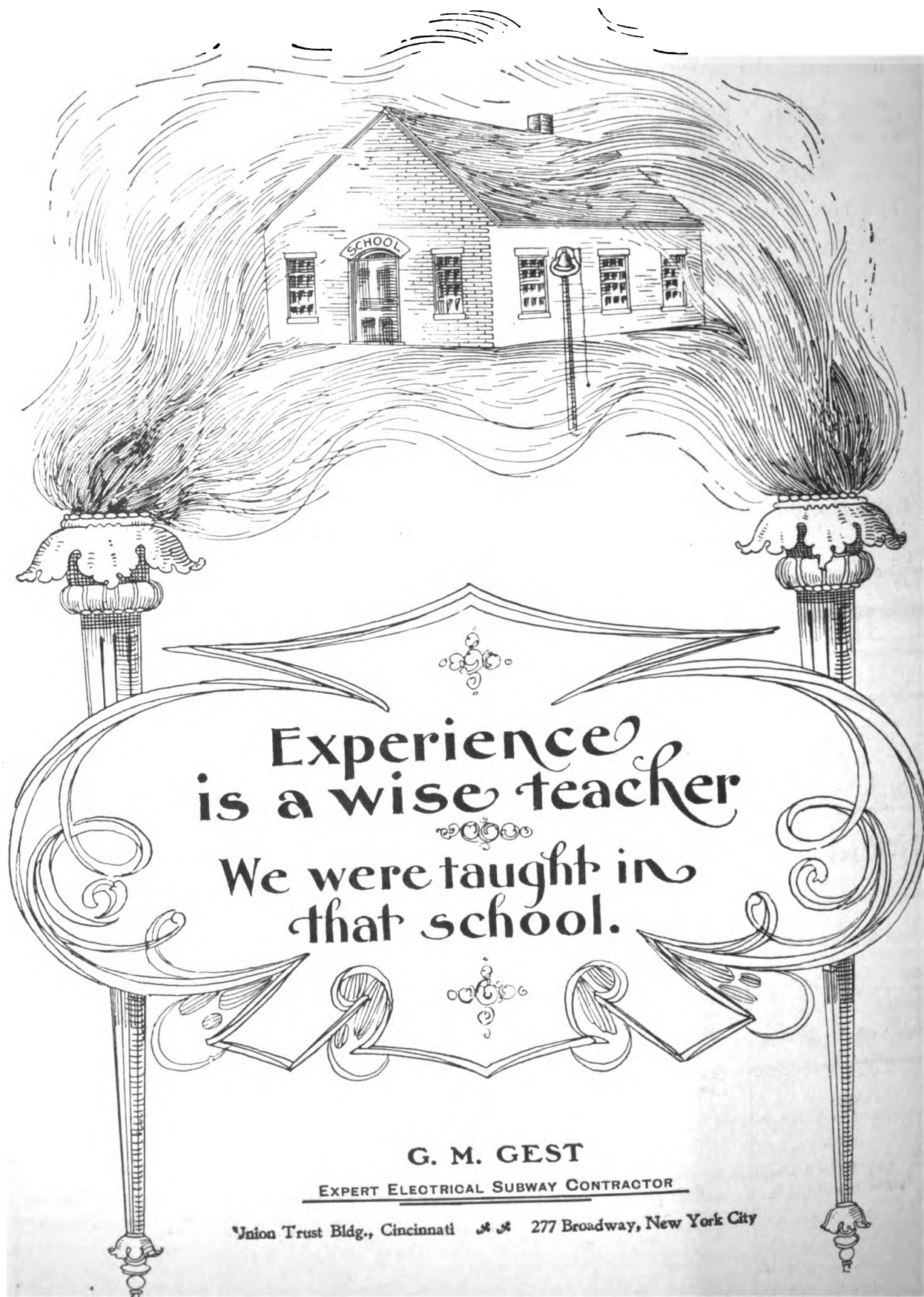
Okonite Co., New York.

Roebing's Sons Co., John A., Trenton, N. J.

Scovill Mfg. Co., Chicago, Ill.

Spargo, James A., Wire Co., Rome, N. Y.

Standard Underground Cable Co., Pittsburg, Pa.



SCHOOL

Experience
is a wise teacher

We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of
Philadelphia how they like our conduit. They
should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

4 MOST

4 EVER

Leich **4** Party

Selective Telephones

Send for our Selective Bulletin B6

NO SPRINGS—NO RELAYS—CONDENSERS IN CIRCUIT

CENTRAL ENERGY

OR

MAGNETO

American Electric Telephone Company



SELECTIVE
IMPEDANCE
COIL



CHICAGO
ILL.



THE AMERICAN TELEPHONE JOURNAL

"A Rolling Stone"

says the old proverb, "gathers no moss." Just so an advertisement that is inserted occasionally, doesn't yield paying results. The buying public is fickle and soon forgets. You've got to give frequent reminders—the oftener the better.

The *weekly paper*, therefore, is the *best medium*. THE AMERICAN TELEPHONE JOURNAL is the *only weekly telephone paper* published. It has the added advantage of a *larger circulation* than all other telephone papers combined. "*The monthly is not in the running!*"

If you haven't already done so, change your tactics at once. Do your reminding through the advertising columns of the *only weekly paper* which is read each week, *four and sometimes five times a month*, by *more telephone men* than all other papers are *once a month*.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MAY 21, 1904—CHICAGO Number 21

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Advertisers' Directory, Page 9

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$2.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

A DRY CELL COMMON BATTERY SYSTEM.....	By Edward A. Tyler
THE USE OF THE PEG COUNT.....	By A. Dallam O'Brien
SOME REMARKS ON INSTRUMENT SETTING.....	By B. C. Wilhelm
CIRCUITS FOR TOLL TRUNKS.....	By F. C. Greenwald
TELEPHONY AND THE PATENT SYSTEM	TELEPHONE RATES IN CONGRESS

The Operating Field:

WINFIELD, KAN., COMPANY HOLDS MEETING
OPENING OF A NEW EXCHANGE
CONCERT GIVEN OVER PHANTOM CIRCUIT
ILLINOIS TELEPHONE MEETING
TRAFFIC AGREEMENT
ANOTHER WAY TO MAKE A GOOD GROUND

CENTRAL UNION AWAKES
PITTSBURG-JOHNSTOWN TELEPHONE COMPANY FIGHT
INDEPENDENT vs. BELL
MEXICAN TELEPHONE COMPANY'S REPORT
QUICK SERVICE RESTORATION
ROCKFORD, ILL., COMPANY'S GROWTH

INSPECTING INDEPENDENT TELEPHONE PROPERTIES

QUERIES

THE EDITOR'S PAGE

PATENTS.

THE WEEK'S MESSAGES

TRADE NOTES

WANT AND FOR SALE ADVERTISEMENTS, PAGE 336

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

**SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK**

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET

CHICAGO, ILL.

Special Offer!

FOR MAY ONLY.

To Introduce Our Latest

"1904 MODELS"

We are Going to Sell at a

Big Reduction

Knowing that each sale means for us
permanent customers.

We have doubled our business in
the past year by honest goods and
square dealings. This year we want
your co-operation. We only ask a fair
trial to prove the quality.

Send now for New Bulletin No.
30 on Magneto Telephones.

**Largest and Most Complete
telephone Factory in the East.**

**CONNECTICUT TELEPHONE
AND ELECTRIC COMPANY**

Meriden, Conn., U. S. A.



EXTRA POWERFUL

The No. 36 X-P Type Telephone will do more work than any other telephone ever put upon the market.

It has a 5-magnet generator, 1600 ohm ringer, long lever self-contained hook with platinum contacts, gold electrode button type transmitter, No. 6 Noxem receiver, carbon lightning arrester, and 2 cells 1900 Dry Battery.

GUARANTEE

Equip a line with twenty No. 36 X-P Type Telephones and we will guarantee to ring the twentieth telephone with eighteen receivers off the hook.

Repair your old telephones. Did you get one of our "telephone parts" bulletins?

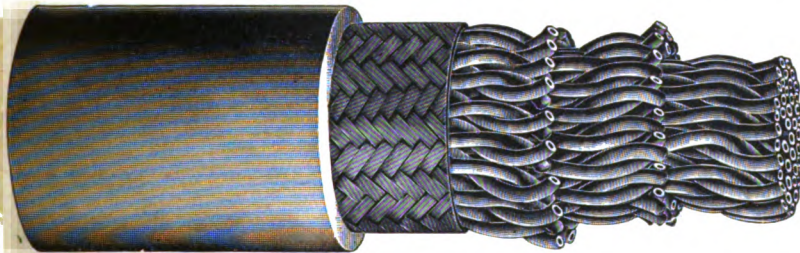
ELECTRIC APPLIANCE CO.,

92 and 94 West Van Buren Street

CHICAGO

WRITE FOR SAMPLE CARD OF WIRES.

Manufacturers of



"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

MAGNET STEEL

Strength, Uniformity and Permanence
Assured by Using

"REMY" BRAND
A.C. LESLIE & CO., Montreal, Can.

AGENTS FOR NORTH AMERICA

Chicago Agent, W. J. BURNS, 163 Randolph St., Chicago, Ill.

USERS of *Eastern* telephones
are enthusiastic as to their
merits. Ask us for a list of
satisfied customers.

Eastern Telephone Mfg. Co.,
West Chester, Pa.

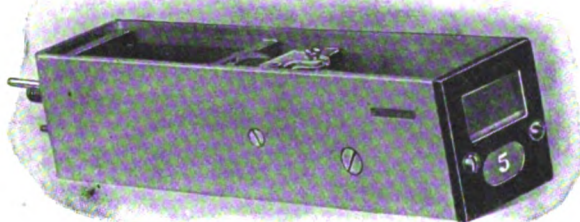
The Recent Patent Decision

does not affect this type of signal built for generator-call or magneto systems. For rapid service it is equal to a lamp signal system and about half as complicated. It is almost as simple as an ordinary tubular drop.

During the past we have sold boards ranging from 50 to 1,000 lines capacity equipped with this type of signal.

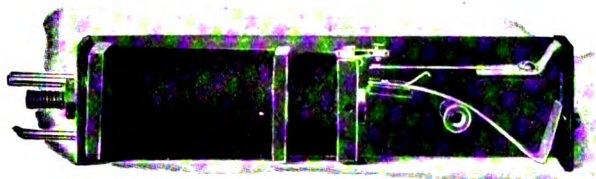
We gladly refer you to companies using them.

**Self
Contained**

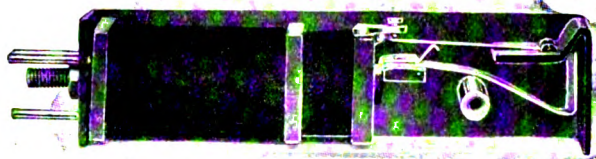


COMPLETE LINE SIGNAL.

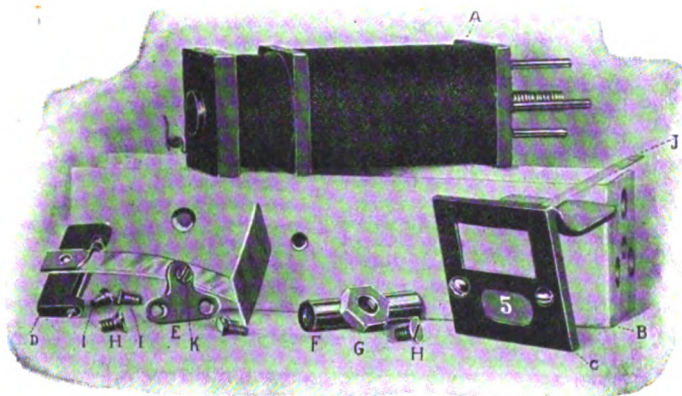
**Easy
to Install**



SIGNAL IN NORMAL POSITION.



POSITION OF SIGNAL AFTER CALLING.



PARTS OF ABOVE SIGNAL.

THEY ARE JUST AS SIMPLE AS THEY LOOK.

The first cost is a trifle more than self-restoring drops but they are well worth the difference, if service counts. We would like to mail printed matter to you describing this apparatus fully.

STROMBERG-CARLSON TELEPHONE MFG. CO.

GENERAL AND EASTERN SALES OFFICE:

Rochester, N. Y.

SALES DEPARTMENT:

Chicago, Ill.

*The Exposition Buildings at St. Louis
will be Equipped with*

KELLOGG TELEPHONES

**The ONLY Telephones
which will be used
at the Exposition.**

Write us for our latest Bulletins, No. 8 and No. 9.
You will find them full of interesting information.

ADDRESS

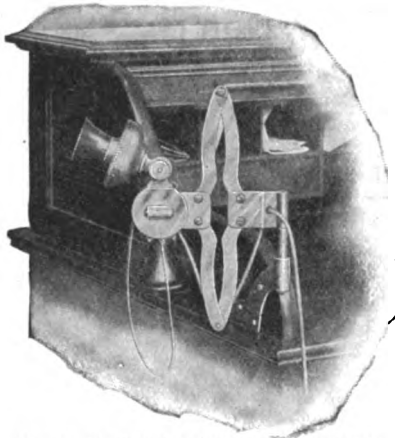
Kellogg Switchboard and Supply Co.,

Green and Congress Streets,

CHICAGO.

**Electric Building,
CLEVELAND.**

**Keystone Telephone Building,
PHILADELPHIA.**



No. 1. CLOSED AND SWUNG OUT OF WAY.

SHORT TALKS ON THE **ADJUSTAPHONE**

No. 3. Its Economy.

ADJUSTAPHONES cost no more than the breakable kind, in the first place,

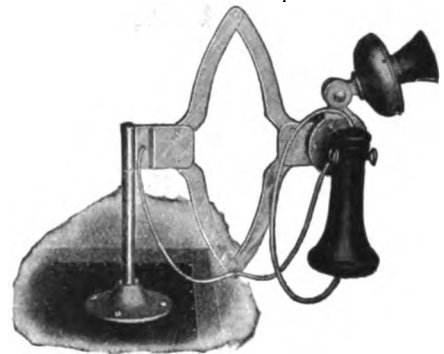
and

ADJUSTAPHONES cost *NOTHING* to maintain after they are once in.

Prices for the asking, and *A FREE TRIAL* if you like.

CHICAGO WRITING MACHINE CO.

105 WENDELL STREET, CHICAGO.



No. 5. FOR FLAT TOP DESK.

SUBSCRIPTION BLANK

Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

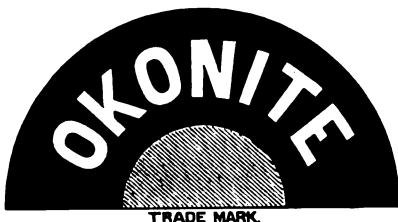
American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

Name.....

P. O. Address.....



1889—Paris Exposition Medal for Rubber Insulation

1893—World's Fair Medal for Rubber Insulation

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., Sole Manufacturers, 253 BROADWAY, NEW YORK

WILLARD L. CANDEE, {
H. DURANT CHEEVER, { Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

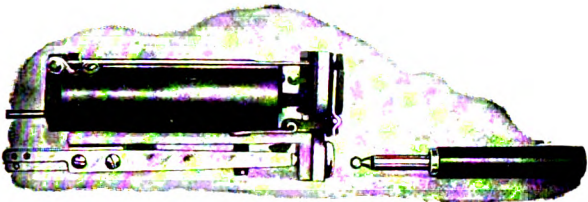
HIPWELL MANUFACTURING COMPANY,
ALLEGHENY, PA.

High Grade Long Distance Telephones

IN THE "International" SWITCHBOARD

the automatic restoration of the drop is "*Accomplished by means dissimilar to the contact of the plug with the drop as the plug enters the jack.*"

(See the decision)



It Don't Infringe

"International" drop fully protected by patents allowed, and **Guaranteed Absolutely Non-Infringing**

A SAMPLE

will convince you that it is electrically and mechanically perfect

International Telephone Mfg. Co.
Harrison and Clinton Streets, Chicago, U. S. A.

Of Course. If They Don't Want Anything

else than the ordinary wall phone, they had better have it,

But if they want something more convenient, for desk, counter, residence, hospital or the many other uses where handiness, readiness, mobility and adjustability are desirable, insist upon

The Pendent Telephone

We regularly manufacture wall and desk types and all accessories, than which there are no better made, but **The Pendent** is our leader—leads the telephone world, in fact.

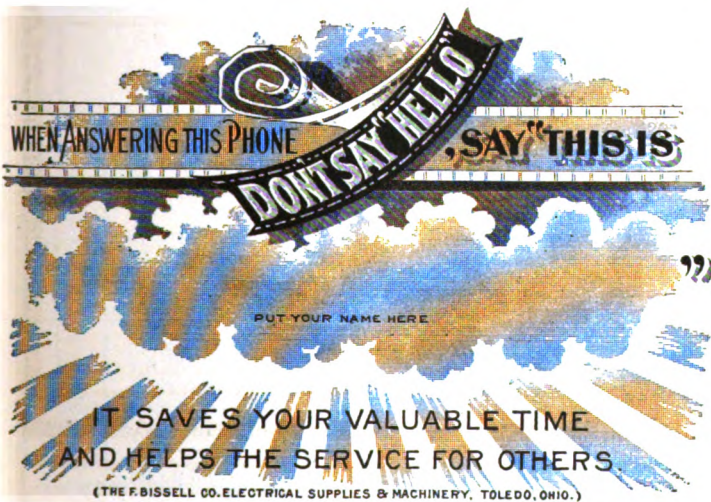
It is ingenious, not intricate, and is highly efficient, durable and very elegant.

You may have one on thirty days' trial, if you will assure us of proper, prompt and appropriate installation and conscientious test.

THE VOUGHT-BERGER CO.,

MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS AND APPLIANCES.

La Crosse, Wis.



FREE

Send for a package of our "Don't Say Hello" Cards

THE F. BISSELL COMPANY

MANUFACTURERS AND JOBBERS OF

TELEPHONE SUPPLIES

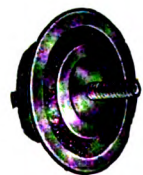
226-228-230 HUROM STREET,

TOLEDO, O.

Reliance Transmitter No. 90



For mounting on woodwork
or adjustable arms



The Button
(actual size)

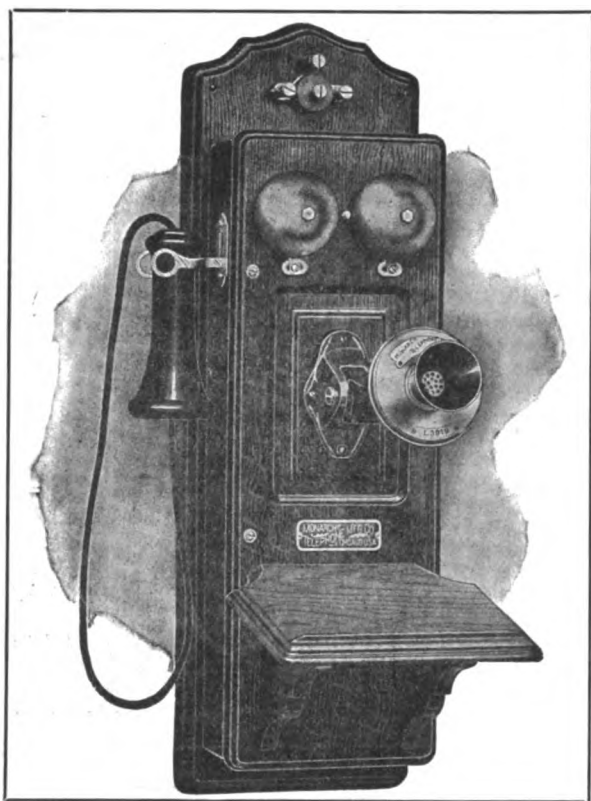
ORDER ONE TO-DAY

SAMPLE PREPAID

\$1.00

S. H. COUCH CO.

162 PEARL ST., BOSTON, MASS.



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

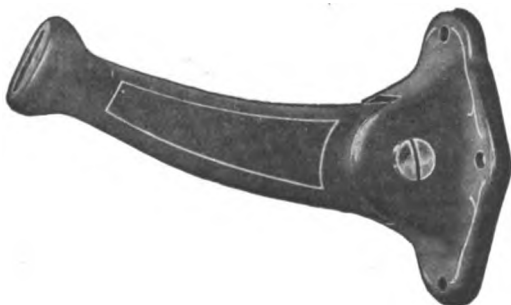
Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

WE HELP TO MAKE

A Good
Telephone



ADDRESS 'BARRARM,' CLEVELAND

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves **immersed in water** in manholes for **several days at a time**, but have had no moisture in our cables from that source. We consider them first-class in every respect; they are **infinitely superior to the old-fashioned wiped sleeve.**

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DUBIN, Sec. & Treas.

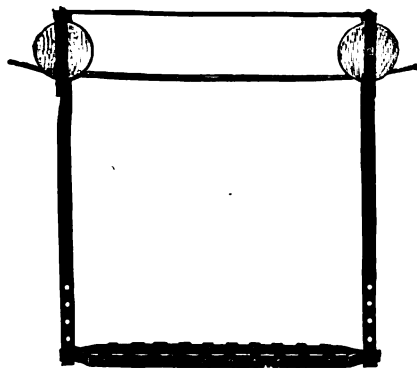
The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

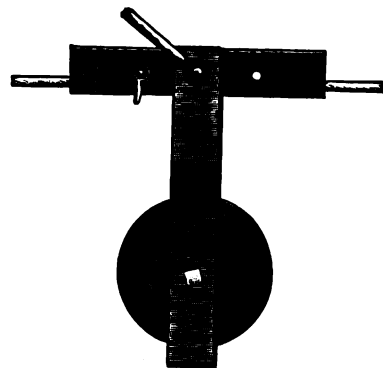
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903
"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.	36	Hipwell Mfg. Co.	6
American Electric Teleph. Co.	40	Holtzer-Cabot Electric Co.	—
Am. School of Correspondence	—	Imperial Finance & Cons. Co.	34
American Vitriol Conduit Co.	39	Indiana Rubber & Insulated Wire Co.	3
Automatic Electric Co.	10	Index of the Technical Press	30
Barr, W. J., Mfg. Co.	8	Inland Steel Co.	32
Beidler, Francis & Co.	33	International Telephone Mfg. Co.	7
Benedict & Burnham Brass & Cop- per Co.	—	Keeling & Ridge Co.	34
Bissell Co., The F.	7	Kellogg Switchboard & Supply Co.	5
Bruno-Grosche & Co.	34	Klein, Mathias, & Sons	34
Bullard & McElligott	12	Lanz M., & Sons	12
Butterfield, J. F.	34	Leslie, A. C., & Co.	3
Cameron Appliance Co.	—	Lewis Lumber & Mfg. Co.	33
Camp, The H. B. Co.	39	Lindsley Bros. Co.	32
Central Mfg. Co.	31	McIntire, C., Co.	36
Central Telephone & Electric Co.	—	Maltby Lumber Co.	29
Century Telephone Const. Co.	11	Medora Milling Co.	33
Chicago, Burlington & Quincy Ry. Co.	35	Merritt & Co.	12
Chicago Insulated Wire Co.	—	Michigan Cedar Co.	33
Chicago Telephone Apparatus Ex- change	34	Middleton, J. W., & Co.	34
Chicago Writing Machine Co.	6	Monarch Telephone Mfg. Co.	8
Churchill, E.	33	Mullen, Frank	33
Cohn & Bock	33	Munk, Otto	9
Columbia Mfg. Co.	33	Nagel, W. G., Electric Co.	9
Connecticut Teleph. & Electric Co.	2	National Battery Co.	9
Cook, Frank B.	—	National Telephone Supply Co.	—
Couch, S. H., Co.	7	National Wire Corporation	10
Crumb, W. H., Co.	8	New Haven Novelty Machine Co.	8
De Veau Tel. Mfg. Co.	—	Nungesser Electric Battery Co.	—
Dickey Clay Mfg. Co., W. S.	36	Okonite Company	6
Eastern Telephone Mfg. Co.	3	Pacific Coast Pole Co.	30
Electric Appliance Co.	3	Pendleton & Gilkey	33
Ericsson Telephone Co.	9	Pignolet, L. M.	32
Erner Hopkins Co.	34	Pittsburg Lake Superior Iron Co.	29
Fahnestock Transmitter Co.	—	Prosser & Son, L.	33
Fowler, John H.	29	Roehling's, John A., Sons Co.	10
Garton-Daniels Co.	11	Sand Point Cedar Co.	30
Gest, G. M.	38	Scovill Mfg. Co.	2
Hemingray Glass Co.	—	Scribner, A. C.	11
		Spargo, James A., Wire Co.	34

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Another New Type

FOR

Common Battery

Very neat and symmet-
rical in design, compact
in form, and perfect in
construction and equip-
ment.

Has genuine Swedish
transmitter and receiver.

Write for particulars.



ERICSSON TELEPHONE CO.

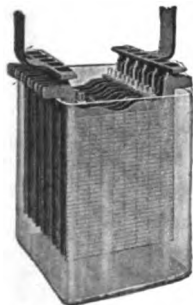
"Independent,"

Mfrs. of Switchboards, Telephones and Telephone Supplies,

296 Broadway,

Dept. E.

NEW YORK, U. S. A.



STORAGE BATTERIES

UP-TO-
DATE

TELEPHONE BATTERIES MUST HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices: NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

Insulated
Electrical
Wires and Cables

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co. TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

Our Automatic Telephone installation at the St. Louis Exposition is the most remarkable electro-mechanical exhibit at the big show. You will find it in the Palace of Electricity, section 24. Inside this great palace we have built a little palace. You are cordially invited to call.

Automatic Electric Company,
CHICAGO, U. S. A.

OUR MOTTO
"Standards of Standards"
ALL WE ASK IS
A COMPARISON



100 LINE LAMP SIGNAL MAGNETO BOARD.

Our
LAMP SIGNAL
MAGNETO SWITCH BOARD

With all its latest improvements

Can Not Be Equalled

Write us for information

Sterling Electric Co.
LAFAYETTE, IND.

Take
A Drop

Put a G. D. Extension Drop on one of your phones. Watch it work for a month. You'll want more of them. Send for sample and pamphlet D6.

**GARTON-DANIELS CO., Keokuk, Iowa**

CENTURY
Switchboard

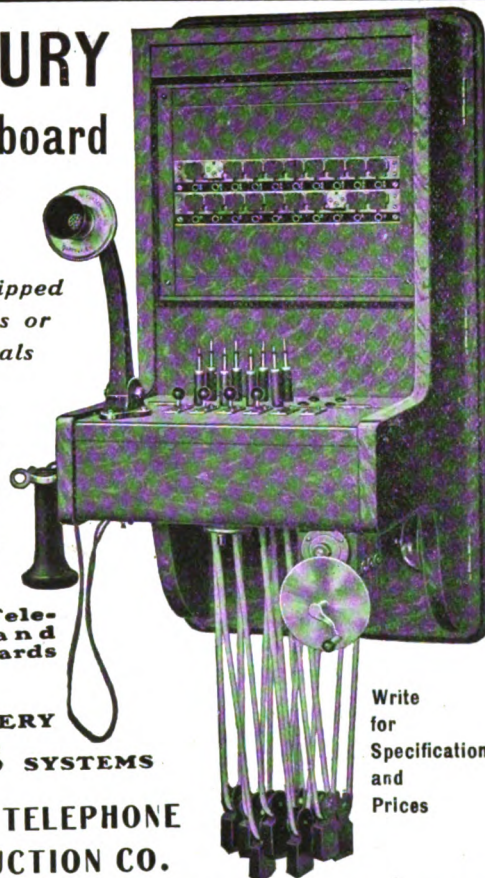
No. 6

*Can be equipped
 with Drops or
 Bell Signals*

*Specially
 adapted
 to Rural
 Lines :*

**We Build Tele-
 phones and
 Switchboards
 for
 COMMON
 BATTERY
 and
 MAGNETO SYSTEMS**

**CENTURY TELEPHONE
 CONSTRUCTION CO.**

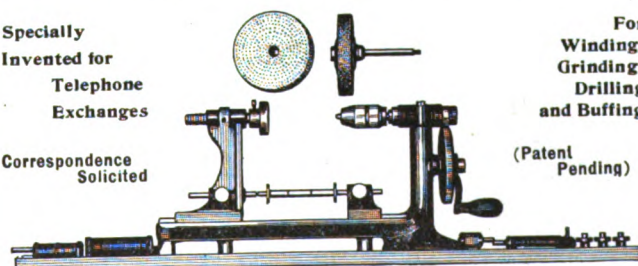
536 ELLICOTT SQUARE, BUFFALO

Write
 for
 Specifications
 and
 Prices

THE EUREKA COMBINATION BENCH LATHE

**Specially
 Invented for
 Telephone
 Exchanges**

Correspondence Solicited



**For
 Winding,
 Grinding,
 Drilling
 and Buffing**

(Patent Pending)

A. C. SCRIBNER, MFR.,
GLOVERSVILLE, N. Y.

In the Life of a Telephone Lies the **PROFIT THEREOF**

How many deadfones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO

NEW TRUNKS

ARE NOT AS GOOD AS

EXPANDED

Metal Lockers

FOR YOUR OPERATORS.

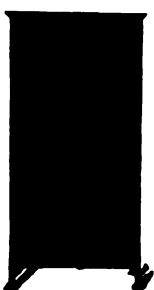
A *Safe and Sanitary* place to leave wraps. Increases the efficiency of your Exchange. In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.

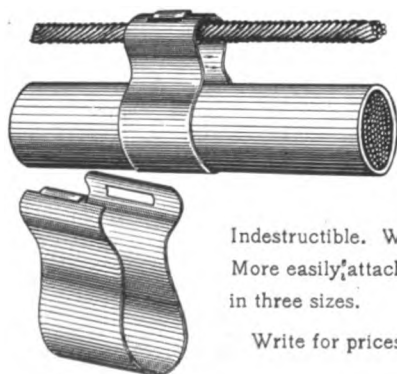


**M. LANZ & SONS,
PITTSBURGH,
PA.**

**PLAIN
AND
GALVANIZED**

Manufacturers
of

**Telephone and
Telegraph Line Material**



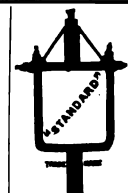
**The
Pittsburgh
Cable Clip**

Indestructible. Will not slip on or cut cable. More easily attached than any other. Made in three sizes.

Write for prices and particulars.

**BULLARD & McELLIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.**

**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON.

NEW YORK.

PHILADELPHIA.

CHICAGO.

SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MAY 21, 1904

NUMBER 21

A DRY CELL COMMON BATTERY SYSTEM

BY EDWARD A. TYLER.

DURING the latter part of April, 1903, a patent was issued for a telephone system operating under the principles of a Wheatstone bridge, but unfortunately the invention failed to fulfill the expectations of the inventor. A glance at Fig. 2 will make the scheme plain. S^1 and S^2 are the variable resistances of a Wheatstone bridge; R^1 and R^2 , the permanent ones; V^1 and V^2 , the signals associated with the stations, X and Y ; M^1 and M^2 , mains or lines common to both stations, and the wires, L^1 and L^2 , the individual lines for each subscriber's circuit. The condenser K completed the circuit between two stations, and also acted as a shunt around the impedances of the signals. The operation was as follows: Suppose the stations X and Y to be connected; also that the resistances of T^1 and T^2 are normally equal. This is only for ease of explanation, as it will be evident that a large variation is permissible in their normal positions. The resistances of R^1 and R^2 are equal. Now suppose that in the act of talking into T^1 its resistance was lowered. Then there would be a change in the potential across R^1 , also between the potentials of A and B . To establish an equilibrium current would flow along the wires L^1 and L^2 to the point B , and in doing so would vary the potential across R^2 . Now, if the resistance of T^1 is raised, the opposite is the case, and current will now flow from T^2 to A .

The results shown are the same when T^2 is the transmitting end. Several intercommunicating systems had been installed, operating under these principles with success, due to the use of a cable of separate wires which offset any effects from induction. In all the systems installed the marked absence of cross talk was a feature which heretofore had proven the bugbear of all single wire common return circuits.

In one system in particular all the stations (22 in number) were in use at one time without any interference. The battery used consisted of 4 large sal ammoniac cells, which were subsequently changed to dry cells. Upon the strength of these successes a common-battery telephone system of a similar design was installed for the Montgomery Telephone Company, of Worcester, Pa. To use a storage battery for power was out of the question, so the apparatus was designed with a resistance sufficiently high to allow the use of primary cells.

In transmission the system was all that could be desired, but the inductive effect of parallel lines had been overlooked, and this proved its failure.

Many schemes were tried, some of which gave excellent results, but were abandoned on account of complexity, and eventually the system was changed over to the regular two-wire circuit. The system as it is to-day is illustrated in Figs. 3, 4 and 5.

Fig. 3 shows a subscribers' circuit, also the cord circuit; Fig. 4, a local trunk circuit, and Fig. 5, long distance cord circuit. After a number of experiments with different types of batteries, it was found that the dry cell gave as good results as any and was far more economical. The reason is not hard to discover. Each subscriber's circuit is composed of a 300 ohm transmitter, a 100 ohm receiver, and a visual of 1,000 ohms, which makes a total resistance of approximately 1,500 ohms, allowing 100 ohms for lines. The E. M. F. is supplied by 16 dry cells of the regular size and is approximately 22 volts. From this it will be seen that for each station in operation there is only about 1/68 of an ampere, or for each completed call 1/34 ampere.

At Centre Point, where there is a 50 line board installed, the average number of connections per day is about 100. There are two sets of battery controlled by a switch, so that they can be used alternately. Each set lasts about 3 months. Allowing 18 cents for a cell, a little calculation will show that the average cost per call is only about 1/20th of a cent and a completed connection 1/10th cent, as far as battery power is concerned. The high resistance of the visuals is a safeguard against external shunts short circuiting the battery.

This system is operating in a farming district, and as a farmers' company possesses some points of interest. No more than four parties are on a line, and the rate is only \$12 per annum. Long distance connections are made with the United Company's lines at Collegeville, which cover nearly the whole eastern part of the State, and have trunks into Philadelphia and Camden, N. J. There are two switchboards, one at Centre Point, Pa., illustrated in Fig. 1, equipped for 50 metallic circuits, and one at North Wales, Pa., of a 30 line capacity. The circuits are all No. 12 iron and have an average length of about two miles. The territory covered has an area of about sixty square miles. The longest subscribers' loop is about 5 miles. That

the circuits are unbalanced to a remarkable degree is evident, yet in practice there is very little noise, except when waiting for the operator to answer. For about a mile the lines are adjacent to a trolley circuit, which has very little effect. At North Wales there is an alternating circuit, which at night under some conditions brings on a good deal of noise; still at no time has communication been prevented. The transpositions average six to the mile, and when the lines are adjacent to trolley or light circuits the number has been increased to 8 and 10.

A few remarks as to the construction of the switchboard. The visuals are mounted behind a solid gird, which is protected by a glass front. The battery leads are No. 8 copper and the straps No. 12 copper. The cross connecting frames are equipped with

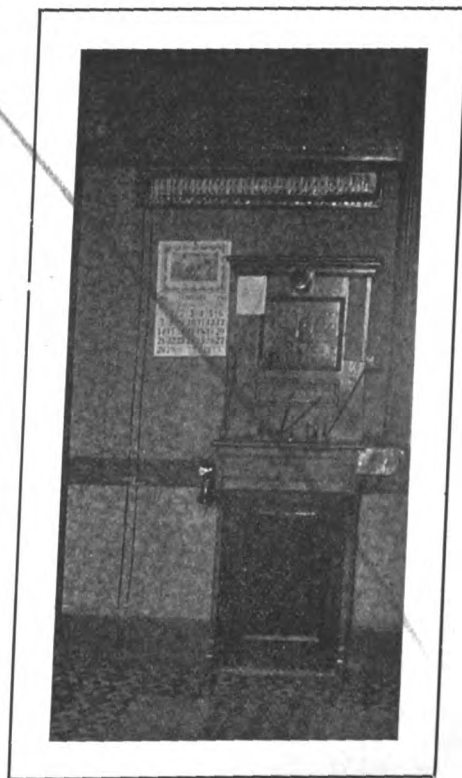


Fig. 1. Common Battery Switchboard at Centre Point, Pa.

tubular fuses, heat coils, and carbons. The listening keys are made in the form of buttons. The long distance line terminates in a self-restoring drop. The local trunks terminate in visuals and are operated by pushing the ringing key which throws battery in circuit. This was designed because the attendants are not al-

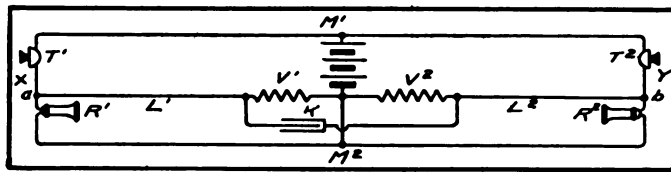


Fig. 2. Wheatstone Bridge Circuit.

ways near the boards, and a steady ring of the signal bell was preferred to the clattering effect caused by the generator signal.

There is also a controlling key, which extends the long distance connection to the branch office without the use of cords. When

a long distance call is being made the 1,000 ohm resistance of the visual is shunted with a 100 ohm retardation coil.

I believe this is the only farmers' line operating with common battery, and at all events the only central energy system using dry cells for power.

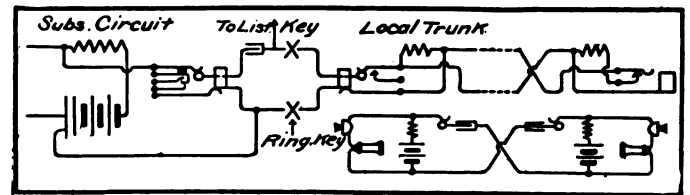


Fig. 4. Local Trunk Circuit.

For information as to the operation, etc., I am indebted to Mr. A. K. Drescher, the manager, and Dr. Michenor, the secretary of the company, who would be pleased to give any further information desired.

TELEPHONY AND THE PATENT SYSTEM

THEORETICALLY, the system of the United States patent office was intended, by offering to every meritorious inventor the sole right to the profits from his discovery for a period of seventeen years, to fortify and to develop American ingenuity. Practically, in a majority of cases, the system effects exactly the result that it was intended to produce, but in the case of telephony the contrary result has taken place. A little more than a quarter of a century ago Professor Bell patented the transmission of speech by an undulatory electrical current. The courts

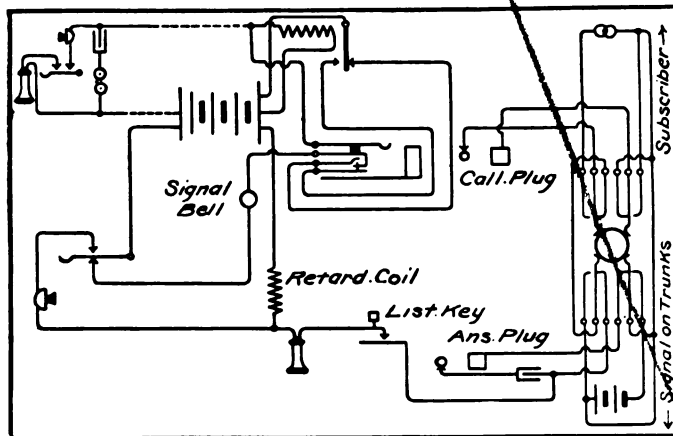


Fig. 3. Subscriber's and Operator's Circuits.

subsequently so construed this patent as to place, within the control of a patentee, every means now known of talking by electricity. Before this broad construction had been fully substantiated Professor Bell had signed his patent to the American Bell Telephone Company, and this corporation then proceeded with what is thought by many to have been a short-sighted policy, to control the entire business of telephony by refusing to sell any apparatus and by permitting the public to use the telephone only as licensees.

By absolutely refusing to sell telephones the Bell company endeavored to secure and hold in its own possession not only the manufacture of all sorts of apparatus which could be useful in the business, but also to retain an absolute control over the commercial operation of all telephone systems. By this policy the American Bell became the sole manufacturers and sole users of all telephonic appliances, and, therefore, entirely controlled the market. An inventor producing a device valuable in connection with the telephone could not use it himself nor could he sell it to any one else excepting the American Bell, for no one owned or had any interest in telephonic developments excepting that company.

Thus, as the Bell company controlled the only market for telephone inventions, there was but little encouragement to would-be

inventors, for they soon found out that their inventions went begging or they must be sold to the American Bell Company at any price that that company chose to pay. It is notorious that for nearly a quarter of a century the Bell company compelled all of its employees to sign a contract agreeing to assign to the American Bell the patents on any devices which such employee might devise, in payment whereof the Bell company offered the magnificent sum of \$50.00 for each and every such invention. The effect of this policy was twofold. In the first place, inventors of merit, who could really produce inventions of value, could use their talents in other fields to much greater profit, and as a result few inventions of marked merit appeared. On the other hand, thousands of amateur mechanics, capable only of devising unessen-

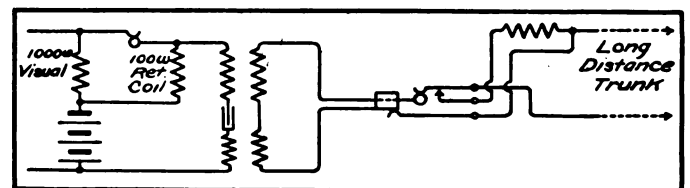


Fig. 5. Long Distance Cord Circuit.

tial modifications of existing contrivances, were by the offer of \$50.00 encouraged to flood the patent office with worthless applications for patents on modifications of unimportant details, and as a result many thousands of patents have been issued that were of less value than the paper upon which they were printed. So great did this temptation prove that it is reported that a couple of the engineers in the employ of the Bell Company have received something over a thousand patents. To assert that all these inventions are valueless would by no means be warranted by the facts, but on the other hand it may be confidently stated that the bulk of them are relatively of little value.

Ten years ago, when the condition of the patents on the speaking instruments became such that it was possible for other manufacturers to enter into the field, a host of inventors started to produce telephonic apparatus, and such has been their success so soon as an opportunity was offered that to-day the Independent interests are said to control, after having been in the field but ten years, a greater number of subscribers than the Bell has succeeded in obtaining in three times that period. This demonstrates conclusively that all the inventive talent in telephony is not confined to the ranks of the Bell.

The effect of the operation of the patent system has been twofold:

There has always been a strong endeavor on the part of the Bell company to so thoroughly instill into the brain of the investing public the idea that all of the fundamental principles not only of speech transmission but of the various details of the line, the cable,

the switchboard and the power plant, were so thoroughly covered by patents held by the Bell company that all who dared to enter the telephone field were either compelled to adopt systems which were inefficient and undesirable, or to run the risk of a litigation with a powerful company, that, backed by almost unlimited capital, would be pretty certain either to win the suit for infringement on its merits or to exhaust and thus drive its opponent from the field. Capital is always timid; and the bugaboo of a long and expensive patent suit was for years the strongest deterrent to Independent telephony.

Thanks to the exertions made by the Independent Telephone Association, which has spent much money and more effort in an endeavor to dispell the uncertainty attending the patent situation, the telephonic atmosphere has been greatly clarified, and it is now pretty well understood that all of the so-called basic patents, those which cover such details as are vital to systems offering first-class service, have either expired or have been so limited in scope by recent decisions that no hesitancy need be felt in investing in any telephone enterprise.

The famous Berliner suit, while technically decided in favor of the complainants, has been so limited by the findings of the court as to restrict it to the construction of an instrument which nobody makes, or wants to make, and is entirely uncommercial and impractical in operation. The patents on the multiple switchboard have been so restricted that even now any company can manufacture a board upon which the swiftest and most satisfactory service can be given. The Carty bridging bell patent is awaiting action of the highest court of appeals, but it is improbable that the final decision, whatever it may be, will be of sufficient scope to restrict the progress of telephony in the slightest.

The public has been wise enough to see that the American Bell Telephone Company undertook to make use of the patent office system in a manner entirely foreign to the intent of the framers

thereof. Instead of using this peculiarly American institution to foster and develop an art in such a manner as to be beneficial both to the inventors and to the nation, the system was employed to restrict invention, to prevent competition, and used to be beneficial only to a corporation whose policy has been an endeavor to enrich itself rather than to benefit the public.

In some respects this effect has reacted upon itself, and by patenting thousands of unimportant, inconsequential details the Bell company has weakened in many respects valuable and important patents which it did control. Further, as soon as the courts perceived that the intention of the Bell was not to legitimately secure a reasonable reward for inventive genius, which while benefitting itself by the legitimate operation of the patent office system, also gave to the public a fair *Quid pro quo*, they commenced to construe the various patents in as narrow and as limited a manner as was possible and to give the broadest and widest construction to the host of detail patents that, by this means, became operative to annul and restrict subsequent inventions.

As the patent situation now stands, it is perfectly safe to assume that telephonic service of the best-known character can be obtained by apparatus manufactured by companies having no affiliations with the American Bell under patents in no wise controlled by the latter company, and that, therefore, capital need have no hesitation in entering the field of telephonic enterprise. So that whether investment in a telephone plant is or is not wise depends solely upon the character of the territory to be served, and is not in the slightest degree complicated by questions of patent ownership. The fact that it has been possible in the past for an unscrupulous corporation to so manipulate the patent system as to divert its real end and aim strongly points to the desirability of such a modification of the existing system as shall render its contingency impractical in the future.

USE OF THE PEG COUNT IN CENTRAL OFFICE OPERATION—ARTICLE I.

By A. DALLAM O'BRIEN.

THE value of a regularly repeated pegcount, in the operation of a central office, has come to be so generally recognized that there is no necessity to offer any excuse for its use. The ease with which the growth of an office may be followed, and

companies and subscribers, namely: Flat rate, message rate, and pay station, and to the fact that the amount of work that a single operator can handle in a day of 24 hours, is limited, and that the operator's work, per call, varies with the class of service, an accurate knowledge of the average number of calls per day is necessary, in order that the number of lines handled by a single operator may be suited to her capacity. In the case of flat rate lines, the subscriber enters into a contract with the telephone company, by which the company agrees to allow an unlimited number of calls within the limits of a given territory, and in consequence there is no necessity for an operator, handling such lines, to make any record of the number of calls originating at flat rate stations, as the yearly charge, however, for service on a flat rate basis is invariably higher than the rate for any other kind of contract, it follows that this class of service is only taken by subscribers whose use of the telephone is very considerable.

It is usual to assume that an operator can handle and complete from 1,600 to 1,800 flat rate calls in the course of 24 hours. This figure, as with all other figures given as representing operators' loads, takes into consideration the fact that the greater part of these calls are handled during three or four hours. With message rate contracts the subscriber pays for a limited number of calls, all over that number being paid for at a predetermined rate per call. Thus it follows that the company is forced to keep a record of the number of originating calls from each message rate line, and this is usually accomplished by the operator, who upon receipt of a call, makes a check record of the number of the line calling, and in cases where the subscriber is in the habit of disputing the company's record the operator also records the number of the line called.

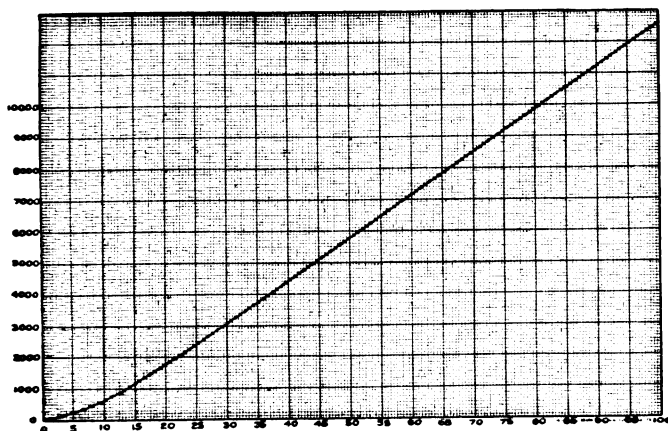


Fig. 1. Curve Showing Proportion of Trunks to Calls.

the approximate estimate of its future needs, would alone justify the time and labor necessitated by a monthly pegcount. It is customary with telephone companies to make a record of this kind at regular monthly intervals, and to use these records as a basis for future additions, and also for the proper distribution of the subscribers' lines among the various operators. Owing to the different classes of contracts that are entered into between telephone

The labor of recording connections of this class can be and is avoided, in a number of cases, by making use of toll counters, so arranged in circuit with the cord that the counter is operated either automatically when a connection between two stations is completed, or through the medium of a button. In this case each line is provided with a toll counter. Although it is customary to consider five minutes as the limit of a single call, and this limit is usually expressed in the contract, yet as the timing of connections involves increased labor on the part of the operator, and as the average length of a connection is usually nearer two minutes than five, it is not common practice to time message-rate calls.

The time consumed in making the check record described, leaves less time for handling calls, and in consequence 800 calls per day is assumed as the operator's load for the message-rate class of line. With calls from pay stations the operator's labor is the same as that involved in the handling of message-rate calls, except for the fact that in this case the connection is timed and charged for at the rate of five minutes per call. While it is unquestionably true that it is not the practice with a great many telephone companies to time pay station calls, yet in a great number of cases the loss to the company resulting from a neglect of this precaution may be very considerable. This matter was thoroughly investigated by the New York Telephone Company several years ago, and as a result of their tests, it was decided to continue the timing of pay station calls.

The labor of timing and supervision required on the part of the operator in handling these calls, further reduces the load that can be carried, so that 500 pay station calls are considered as a day's work. The above figures are given on the basis of a common battery installation, with automatic calling and disconnect signals; with ring down signals the operators' loads will be somewhat lower than given where the local district is served by more than one central office, these being connected by trunk lines, there will of necessity be a certain percentage of the originating calls at each office which must be trunked, and the number of incoming calls over trunk lines that can be handled by a single operator, is dependent upon the kind of connecting trunks used.

There are three classes of trunk lines in general use between offices: the circuit trunk, which terminates in a jack at the sending end, and in a cord and plug at the receiving end, and which is equipped with an automatic disconnect signal at the receiving end. The ring-down trunk, which consists of a jack at the sending end, and a jack and drop at the receiving end; and the common trunk, which is used for connections originating at either office, and is equipped with a jack and drop at both ends of the line. The question as to which of the above classes of trunks shall be used between central offices, is decided by the volume of traffic between them, and it is usually considered that 75 calls each way per day warrants the use of circuit trunks. This class of trunk is naturally more efficient than either the ring-down or common trunk, and the efficiency curve, in Fig. 1, illustrates very clearly the trunk capacity in groups of various numbers.

From an inspection of this curve, it will be seen that the number of calls that can be handled by a single trunk increases rapidly, as the number of trunks in a group increases; for instance: with a group of four trunks, each trunk has a capacity of about 25 calls, while in a group of fifty trunks, the unit capacity is somewhat over 100 calls. This result is what might well be expected, as in the large groups the chances that all the trunks may be busy at the

same time are small, and consequently the trunks may be worked at a higher rate. With ring-down trunks the efficiency is probably about two-thirds of that shown for circuit trunks, and with common trunks the efficiency will fall still lower. In the modern common battery switchboard, the use of common trunks is kept as low as possible, as they require that one position be equipped as a common trunk answering position, and in addition the jacks must be multiplied throughout the board for the use of the subscribers' operators, the trunk signal, however, appearing only at the common trunk position. The ring-down trunks are in a like manner multiplied throughout the switchboard for sending purposes, while the receiving trunks of this class appear with their signals at a receiving trunk position. It is of course desirable in cases where the number of ring-down and common trunks is not too great, to terminate them with their signals at one position, so that they may all be handled by the same operator.

The out-going circuit trunks are, of course, multiplied throughout the switchboard before the subscribers' operators, while the incoming trunks, which terminate in a cord and plug, are located at separate trunk positions, the usual equipment being from 28 to 32 trunks per position.

It is the function of the pegcount and of the monthly report of connections, which forms an important part of the pegcount, to place clearly before the central office manager, the traffic conditions existing in the office, and from the data thus obtained the distribution of lines and the number and class of trunks can be intelligently and correctly determined. The amount of information that is incorporated in the pegcount necessarily varies with the different companies, and with different methods, but it is safe to say that it is impossible to make this information contain too much detail of the actual operating conditions. The usual practice is to determine upon a certain day in each month, for example, the Wednesday nearest the 10th of the month, and take this day as representing the average daily business. The count is then started at 12 o'clock Tuesday night and continued until 12 o'clock Wednesday

night, thus covering a period of twenty-four hours. During this time the results are taken and tabulated, as will be explained later, for each hour, and at the end of the count the various sub-divisions totaled, the load curve plotted, and the count made up in shape for use.

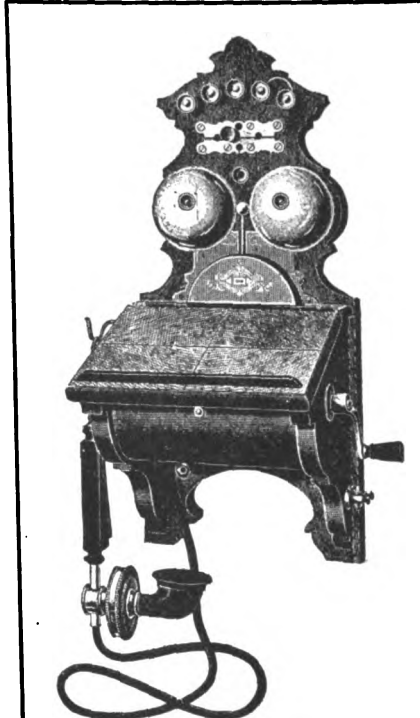
GERMAN TELEPHONE SYSTEM.

THE total cost of the German federal telephone system, operated in connection with the German federal telegraph system, is \$60,000,000 up to date. The kingdoms of Bavaria and Wurtemberg are not included, these having their own independent telephone systems.

The longest telephone connection in Germany is the one between Berlin and Paris, 742 miles. Next is Berlin and Budapest, 612 miles; Berlin and Memel, 593 miles; Berlin and Basel, 577 miles.

The line between Berlin and Frankfurt is the most used—485 communications daily. The number between Berlin and Cologne is 243; Berlin and Vienna, 118, and Berlin and Dusseldorf, 116. In spite of the high fee, not less than 65 communications daily take place between Berlin and Paris.

Long distance lines are being projected to reach all the principal European cities, and by the aid of the Pupin system as exploited by the Siemens & Halske Company the ultimate connection with England is assured.



GERMAN MAGNETO SET.

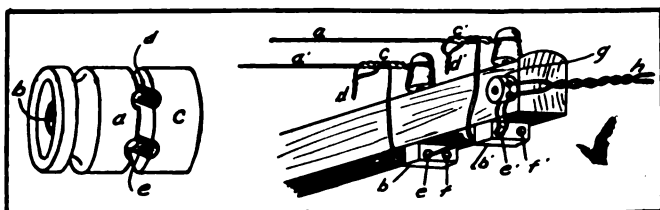
The above is a reproduction of a German magneto wall set of a type in quite common use in that country. Of the five binding posts at its top, two are for the line wires, two more for battery leads and the other is for ground wire, which runs to the lightning arrester. The batteries are not contained in the instrument but are installed in some "out-of-the-way" place. The bell rings with the usual alternating current and the magneto generates a current at thirty-five volts. The wood finish is walnut. Here the micro-telephone prevails.

SOME REMARKS ON INSTRUMENT SETTING

BUILDING THE DROP LINES.

By B. C. WILHELM.

IN discussing the subject of setting instruments the case will be taken first where the line is of the open wire type, dead ended at the pole. The drop wire should be connected to the terminals of the line wire, and brought to the springing off point of the cross-arm in such a manner as not to touch the arm at any point. A good method is shown in Fig. 1. The drop wire is stripped of its insulation for about six inches. To insure the wire not touching the cross-arm, two pine cleats, *b* and *b'*, are screwed to the under side of the arm, in such a manner that the outer sur-



Figs. 1 and 2.

face of each will be directly under the inner edge of each pin. Each cleat has two holes, *e*, *f* and *e'*, *f'*, bored through it. The pair of wires are threaded through the hole *e'* of the outer cleat, and one conductor is brought up, wound $2\frac{1}{2}$ times around the McIntire sleeve on the line wire *a*. The skinned end is then wrapped around the free end of the line wire, as shown at *d'*, and soldered. The other conductor is brought through the hole *e* of the cleat *b*, and secured in the same way to the other wire *a'*. The object in wrapping the drop wires about the sleeves is to prevent any accidental pull from coming on the soldered joint. A split knob insulator, *g*, is screwed to the side of the cross-arm as shown; and the conductors are passed through the grooves which hold them securely in position. From this point the wires are brought off, as shown at *h*, to the subscriber's station. If the wires on the next pair of pins end at this hole the drop wire would be brought

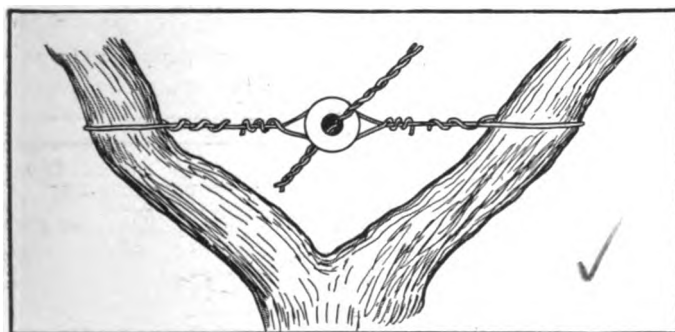


Fig. 3.

through the holes *f* and *f'* and fastened to a split insulator placed on the opposite side of the cross-arm.

Should it become necessary to bring the remaining lines off at this cross-arm, the additional cleats and insulators necessary should be placed on the arm and the drop wires fastened in the same manner.

A detail of the split knob is shown in Fig. 2. It is constructed in two parts, the upper part being shown at *a* and the lower at *c*. A hole, *b*, is drilled through the center of the two for the reception of the screw which holds it to the cross-arm. At *e* and *d* are grooves to hold the wire.

Where the drop line wire, run from the terminal to the subscriber's residence, is short, the jump from the pole to the residence can be made in one span. Where longer, several spans have to be made and the wire attached at intermediate points. These points of attachment often lie on private property, and the consent

of the owners must be obtained, not only for attaching the wires, but also for the privilege of running it across the premises.

In selecting a route for the drop line care must be used to avoid placing it in dangerous proximity to electric light, power, telegraph or other foreign wires. Care must also be taken where highways are to be crossed, to keep the wire at a sufficient height to clear the traffic that passes underneath. Wherever possible the drop wires should cross above foreign wires, since under these conditions accidents happening to the foreign wires cannot affect the telephone lines. In running near electric light and power wires the drop wire should not be carried parallel to them for any considerable distance.

Where the wire is attached to poles or buildings the split knob insulator is used. Where the wire is fastened to trees another plan should be adopted on account of the swaying motion of the point of attachment in high winds. The two methods illustrated in Figs. 3 and 4 hold the wire securely and yet allow of sufficient play to preserve them from breaking under the strain caused by the swaying of the tree. The method shown in Fig. 3 is that

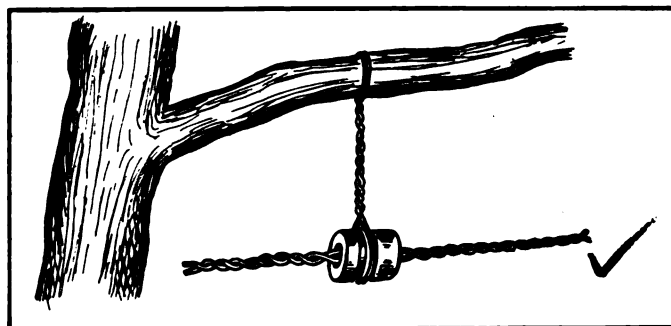


Fig. 4.

used where the drop line runs through a fork in the tree. A porcelain insulator is fastened to a piece of drop wire, placed in the grooves on both sides. The wire is then bound tightly to the insulator by means of bare wire, as shown in the figure, and the two ends are then fastened around the limbs. The drop wires are passed through the screw hole. As the tree sways, the insulator sways with it, and passes along the drop wire, which rests on the screw hole.

The method shown in Fig. 4 is used where the limb is in a sufficiently horizontal direction to allow the wire to clear the trunk. Here the same style of insulator is used, but it is merely suspended from the limb. The drop wire passes through the screw hole as before. Where the houses are detached a good plan is to attach under the eaves of the roof. The wire is thus kept out of sight, and is also afforded a degree of protection. The wire should never be allowed to rest upon the roof of a building, as when this practice is resorted to it is very apt to be walked upon. The heat caused by the direct rays of the sun and the reflected rays from the roof softens the insulation and cause it to deteriorate. In running through trees care should be taken to avoid the branches as much as possible, because wherever they come in contact with the wire they rub and chafe the braid. It is preferable to choose such a path that the wire may be supported every 75 feet. Spans longer than 150 feet should never be employed.

The point on the subscriber's residence where the wire is to be attached should be that nearest to the last supporting point of the wire. It should also be located to allow the most direct run into the subscriber's premises. The method of attaching to the building depends upon the nature of the material to which the attachment is to be made. Where the material is wood the split insulator

is used. Where brick or masonry walls are to be fastened to, a bracket, such as shown in Fig. 5, is the most serviceable. Another form of wall block is shown in Fig. 6. The point where the wire is brought through the wall should be located as near the place to be occupied by the telephone as possible. This consideration may

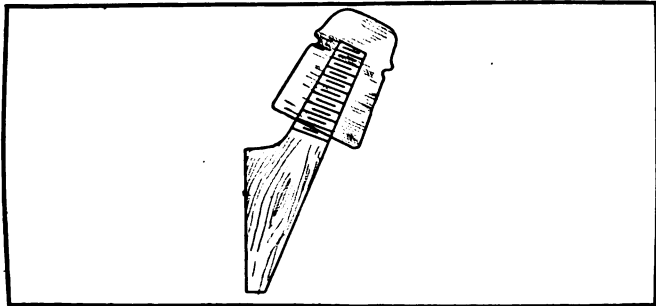


Fig. 5.

be modified, since while it is advantageous to have the run short, it is more important to reach the telephone from outside with minimum amount of work in penetrating walls. After having secured the information as to the route the instrument setter should inspect the locality to ascertain whether there are any obstacles lying in the path which he is to use, bearing in mind that the wire should always be run in the least conspicuous way and at the same time be protected. One of the best places to pierce the

wall is at the bottom of the window frame, since the hole will pierce the inner surface of the wall at the bottom of the frame, and be shielded by the edge of the wood. The hole through the plaster will be hardly perceptible.

The size of the holes depends upon whether the drop wire is to be run inside, or whether leading-in wire is to be used for this

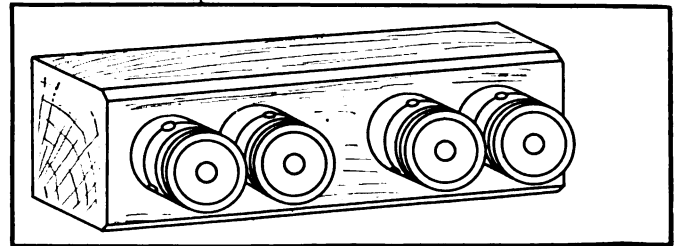


Fig. 6.

purpose. Where the drop wire is brought through the wall a $\frac{3}{8}$ -inch hole is necessary; where leading-in wire is used a $\frac{1}{4}$ -inch hole is of the proper size. The hole should always be drilled from the inside of the wall when it is plastered, because when the direction is reversed the plaster is sure to be broken away. The holes should always be made to slope upwards in passing from the outside to the inside so that rain cannot gain access to the interior by this path. The angle at which they should be inclined is about 20 degrees.

CIRCUITS FOR TOLL TRUNKS

By F. C. GREENWALD.

IN the design of circuits and apparatus for toll and long-distance connections it is very important that their operation may be reliable and also that complications in the method of operating may be reduced to a minimum. The writer has found the circuits hereafter to be described to give entire satisfaction to both the traffic manager as well as the wire chief. This equipment is being used by The United Telephone and Telegraph Company at Harrisburg, Pa.

The long-distance board consists of three positions, each equipped with six pairs of "local to toll," cords, four pairs of "toll to toll," cords, twenty toll line drops, and ten trunks to local

ture, causing it to be attracted by either one of the poles of the permanent magnet, thus closing or opening the local supervisory lamp circuit. The polarized relays take the place of ring-off drops, and are more uniform and positive in action. The operators rely on the local supervision for "local to toll" connection.

The "toll to toll" cords are straight metallic, except that they, like the "local to toll" cord circuits, are equipped with ringing keys for both cords. Should a pair of these cords connect Philadelphia and Chambersburg, transmission would not be impaired, and either exchange could ring the other without interfering with, or needing the aid of, the Harrisburg operator. An impedance coil is inserted in the operator's circuit, so that should she listen

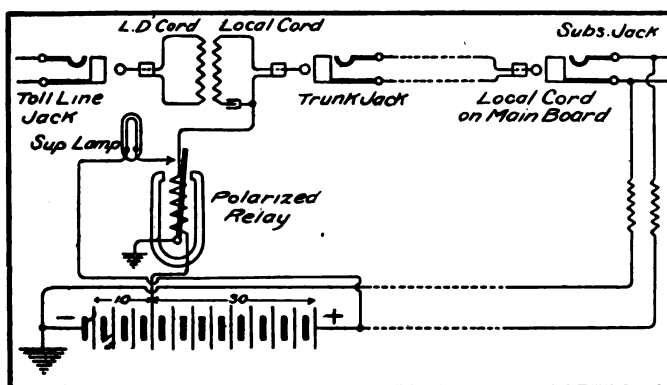


Fig. 1. Supervisor Controlled by Polarized Relay.

board, together with necessary relays and accessories. The local to toll cords are of the type adopted by the United Telephone and Telegraph Company, in all their new boards, the main features of which are: ringing keys to both cords; the long-distance side bridged by two M.F. condensers and winding of repeating coil in series. To the terminal on the plug side of the condenser a polarized relay is attached, which controls the local supervisory circuit. Fig. 1 illustrates the operation of this relay.

It will readily be noticed that when the plug is inserted in the jack at the end of the trunk from the local board that battery will flow through the pivoted armature, placed between the opposite poles of a permanent magnet, in one or the other direction, depending upon whether the subscriber is on or off the line. The direction of flow of current determines the polarity of the arma-

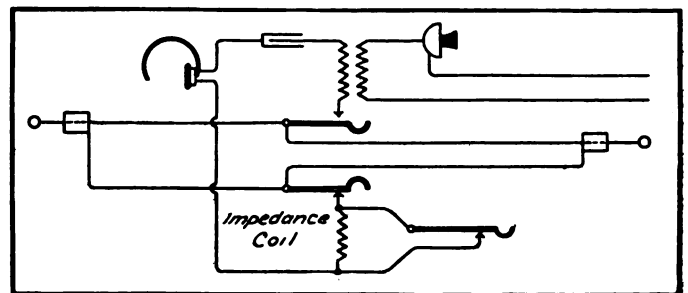


Fig. 2. Operator's Circuit.

in for supervisory purpose the talking qualities of the connection would not be interfered with. Fig. 2 shows this arrangement clearly.

In listening in on a through connection the operator would first operate key, inserting the impedance coil into circuit with the secondary and receiver. She then would not materially affect the line, and still be able to determine whether or not it was in use.

The two boards being in different parts of the building, the toll operator cannot connect directly to the subscribers answering or multiple jack. To establish the necessary connection the following trunking system was installed.

A cable composed of triple wires was run from the local board to the toll board. Two of the three wires terminate at one end in a jack, and at the other in cord and plug. The third wire is used to connect two lamps which are in parallel, and each having battery on one of their terminals. By means of inside contacts in

jacks on the toll end of the trunk a relay is bridged across, controlling both these lamps. Fig. 3 is this arrangement.

It will be seen should subscriber want a long distance connection the trunking operator at the local board will insert the plug at her end of the trunk in the multiple jack corresponding to the subscriber's telephone number. This will energize the relay on the toll board, lighting the cord lamp at the local position, and also

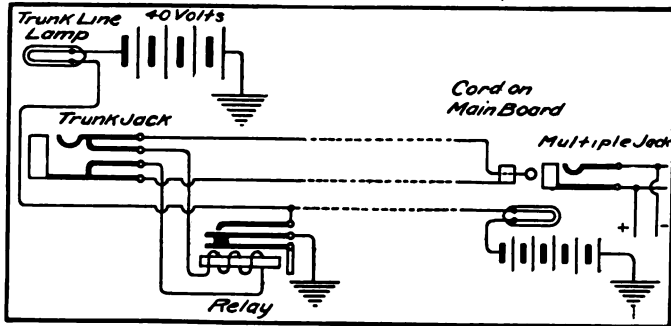


Fig. 3. Trunk to Multiple Board.

the lamp corresponding to the particular trunk, above the jack on the toll end of the trunk. When the toll operator plugs in the relay connection is opened, both lamps go out, and the trunking operator on the local end knows that the long-distance operator is taking the subscriber's call. Similarly when the long-distance operator takes down her connection the local operator is notified to take down her connection by the lamp on her position lighting. By this means either of the operators know whether the other has put up or taken down the connection. Order wire circuits are used between the local and toll boards.

Fig. 4 illustrates a peculiar method of connecting a toll line. The line terminates on the tip and sleeve of the toll line jack; through inside contacts connection is made to the protection in

the local operator has inserted plug in subscriber's jack, using the same method as that used by the local operator on the local board. All relays, repeating coils, etc., are placed in the long-distance board, excepting the cords and supervisory lamps used on the local trunking position. A double plug is used to connect the operator's set with the remaining portion of the operator's circuit.

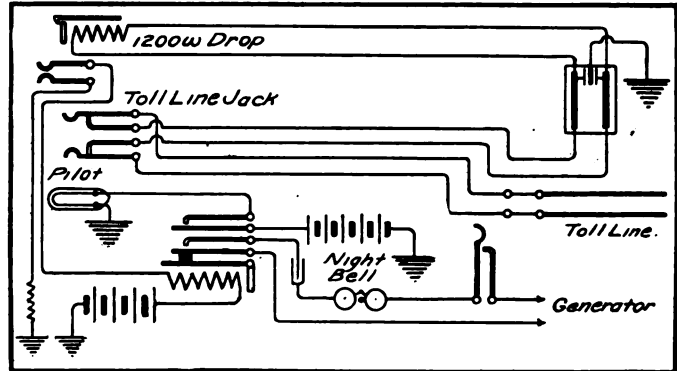


Fig. 4. Toll Trunk.

TELEPHONE RATES IN CONGRESS.

THE conference report on the District appropriation bill has been laid before the Senate and House of Representatives at Washington, there being a complete agreement on nearly all the questions in dispute. A contest was anticipated in the House over the paragraph fixing a maximum charge for telephone rental in the District. The House inserted a provision that for official purposes and in private residences no more than the rate fixed by existing law, which has been ignored by the telephone company, should be charged. The Senate amendment, agreed to by the conferees, provides:

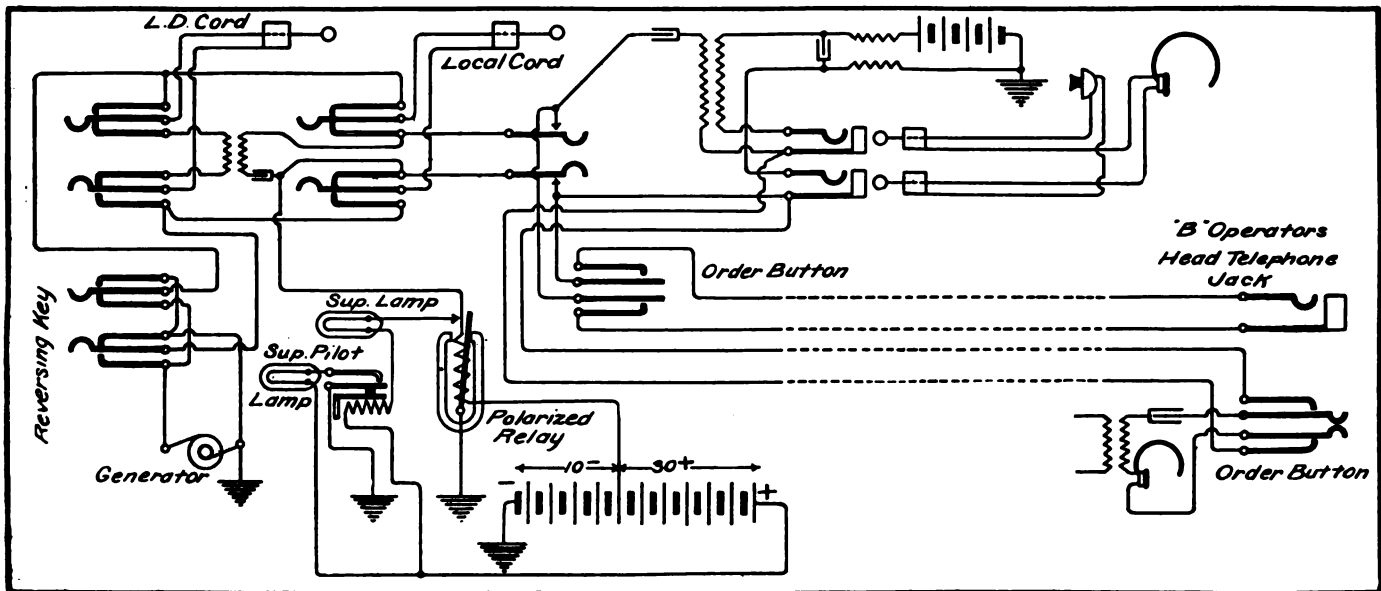


Fig. 5. Detail of Toll Trunk Position Circuits.

cable terminal room. From the protector the line returns to the line drop. In this way when the line is in use the drop and protector is cut out, ensuring a clear line as far as the exchange is concerned.

Fig. 5 is a detail sketch, and shows the accessories to these special features. By referring to the figure a better understanding may be obtained of the different parts and their functions.

A good feature of this circuit is the manner in which supervision of the local subscriber is transferred to the toll board using only a two-wire trunk. This trunk, having no battery on either side, affords the same advantage as does a multiple on the local board, allowing supervision without interfering with the busy test on local positions. It is also evident that the local operator is not required to ring the local party. The toll operator can ring out on either side to ground as well as metallic over this trunk after

"That the Government shall not pay for the use of any telephone in the District more than \$60 per annum on an individual metallic circuit, \$48 for each telephone on the same premises with two telephones on the same circuit, and no contract is to be made with the telephone company in excess of those rates.

"It is also provided that until the population of the city shall be 350,000 or over no more than the above specified rate shall be charged by any telephone company for use of telephones at private residences within the District, and 'any acts or parts of acts heretofore enacted fixing telephone rates for grounded circuit in the District are hereby repealed.'

"It is also provided that the refusal of the company to comply with these provisions shall be a misdemeanor subjecting the company to a fine of not less than \$100 nor more than \$500 for each offense."

CO-OPERATION BETWEEN LONG DISTANCE COMPANIES.

AN announcement has been going the rounds of the press to the effect that a movement is on foot for the consolidation of all the Independent telephone lines in the country. It is doubtful if this consolidation ever takes place. As it seems now, after ten years of experience, the future development of telephony will be along the line of Independent, individual systems, local in their scope and managed by local men, thoroughly conversant with the needs and rights of the public to be served.

But this is true only in respect to the local exchanges. There is every reason, if not for the consolidation, at least for the scientific co-operation of the Independent long distance companies, and there is every probability that this consolidation or co-operation will eventually take place. When this occurs, the last claim for superiority on the part of the Bell Company will disappear. In its long distance service alone has the Bell monopoly been able to successfully compete with the vigorous and wise competition of local Independent companies. It was inevitable that the revolt from Bell tyranny should first take the shape of local exchanges. And it is just as inevitable that such Independent exchanges having been established throughout the country until the number of Independent telephones in use actually outnumber those of the old Bell, these exchanges will gradually draw together in order to give the public an Independent long distance service.

There seems every reason to believe that the public will be as much benefited by the competition of long distance Independent telephone lines as it has undeniably been because of the establishment of local Independent exchanges. The remarkable development of Independent competition has set telephony ahead a dozen years. People who object to two telephone systems and cry out in favor of what is called a "natural monopoly" forget this.

Those who live in cities and communities which have both Bell and Independent systems are apt to consider only their own present convenience. They see two separate systems and the necessity of going to the inconvenience of two telephones or else of having no connection with a greater or less proportion of the telephone subscribers.

"How much better it would be," they say, "if we had only one system and could reach all of the people of the community through a single telephone." And there seems reason in this, until we come to consider what the situation would have been had there been no Independent competition established. These two telephones now cost but little, if any, more than did one when

LOCAL MANAGEMENT FOR LOCAL SYSTEMS.

the Bell Company was enjoying all the privileges of a "natural monopoly." And the number of people who can be reached by this expenditure has quadrupled and is still advancing rapidly.

Moreover, the service and respect for the rights of the people have improved greatly since competition put out its compelling hand.

It is interesting to note that in this world, as far as we are able to see, matters adjust themselves automatically, if nature is allowed to take its course. When the telephone was a new thing and the parent company was fully protected by patents which gave it an absolute monopoly, development could only take place within this monopoly and along lines laid down by its promoters. It was inevitable that they should be conservative, should feel their way, so to speak, pocket their great earnings exultingly, water their stock complacently and grow more and more careless of the rights of the public they served as they grew in power and wealth. All this is human nature. It is doubtful if the present Independent operators would have done much different under the same conditions and with the same experience. Human nature is much the same everywhere, and whenever the public is chained, human greed, expressing itself through monopoly, is certain to become tyrannical. But when ten years ago these chains were stricken off by the expiration of the Bell patents and a natural development of telephony became possible, the automatic adjustment referred to began. In the long run the evils of society are self-corrective and in matters of business competition is the lever by which this adjustment is made.

This adjustment is still in progress and will continue until long distance telephony as well as local is brought within the restraining influence of competition. When Independent telephony ceases to conserve the rights of the people and forgets the conditions and experiences from which it was born, if such time ever comes, then this same law will operate against the Independent and in favor of the people. For the telephone has grown to be a public necessity. To limit its development or retard its growth is to stand in the way of freedom of speech. The public will not permit its right to talk to be trifled with or to be juggled with by a lot of Boston financiers whose only interest in the matter is the interest on their investment. The people recognize the telephone as a proper subject for business exploitation and they are willing to pay a proper sum for the service, but never again will they permit an exorbitant tax on the right of speech and never will they allow a monopoly to grow fat and tyrannical under their patient suffering.



The Telephone in the Courts

Conducted by A. H. McMillan.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

CONTRACT BY TELEPHONE—PLACE OF MAKING.

A CONTRACT consists of an offer made by one party and an acceptance of the offer by the other party. The offer may be made in one State or city and the acceptance in another. In such cases it often becomes necessary to determine, for purposes of jurisdiction, in which city or State the contract was made. In a case in California, a contract was made by telephone, the offerer and acceptor being in different counties. The question arose, at which end of the line the contract was made, and the court held that it was made at the acceptor's end of the line. *Bank of Yolo v. Sperry Flour Co.*, 74 Pac. 855. This ruling follows the doctrine that a contract made by the exchange of letters is completed at the time and place of mailing the letter of acceptance and that a contract made by telegraph is completed on the leaving of a telegram of acceptance with the telegraph company for transmission. *Garrettson v. North Atchison Bank*, 47 Fed. 867."

TT has been said in criticism of the ruling in *vs. Hart*, *Law* *Rev.*

holds that the defendant company had no right to erect its poles and string its wires upon a street in front of the plaintiff's property at Bay Side, and authority is given the plaintiff to remove the objectionable superstructure from the street.

The telephone company set up, about a year and a half ago, nine poles in a distance of 1,100 feet, in front of Mr. Week's property, in spite of the protest of the owner. The work was done under the authority of a permit granted by the city authorities. Mr. Weeks, as owner in fee of the highway fronting his property, asked for an injunction, but as this was not granted, he began a regular suit for ejectment, which brought out the fact of the plaintiff's ownership to the middle of the highway, as is the case, it is said, in nearly all country and suburban roads.

The case is highly important, it is said, in establishing the right owners of property adjacent to highways to remove poles and lines of telephone, telegraph and electric companies when such lines were set up without the owner's consent. It will give owners right in the future to determine the location of such poles and lines and thus to save their shade trees.

REMOTE AND PROXIMATE CAUSE.

THE case of *Leeds vs. New York Telephone Company*, 80 N. Y. Supp. 114, has been reversed by the Court of Appeals of New York, the court holding that the act of negligence complained of was too remote to be the cause of the accident. The facts in the case were these. A telephone wire had been strung for two years from a chimney over a street at a height of about 39 feet from the ground. A new steel-frame building being constructed, for which a derrick was used to lift pieces of framework. The boom of the derrick, 55 feet long, was carelessly allowed to strike the wire with sufficient force to pull the chimney over. Some of the bricks struck the plaintiff and caused the injury complained of. It was contended that the chimney had been weakened by decay and that the telephone company was negligent in not inspecting it and ascertaining its condition. The plaintiff recovered.

The court held that the negligence of the telephone company was not the natural and efficient cause of the accident, but that



IN THE OPERATING FIELD.

WINFIELD, KAN., COMPANY HOLDS MEETING.

AT the annual meeting of stockholders of the Winfield, Kan., telephone company, the following board of directors was elected: J. E. Jarvis, Jos. J. Brady, W. A. Caman, R. V. Montague, W. G. Francis, J. H. Montague and J. F. Hemenway. This company was organized during the summer of 1901, since which time it has constructed telephone exchanges in the cities of Winfield, Burden and Dexter in Cowley county, and at Oxford, in Sumner county. Practically every subscriber in Cowley county is now reached over its toll lines.

This company now has in Winfield, 634 subscribers, at Burden 60, at Oxford 43 and at Dexter 27.

It is incorporated under the laws of the State of Kansas, with an authorized capital stock of \$75,000, divided into 1,500 shares of the par value of \$50 per share, and of which there is fully paid up \$50,000. The par value was placed at \$50 per share in order that every subscriber for a telephone who desired to do so, might become interested in the plant.

CENTRAL UNION AWAKES.

THE Central Union Telephone Company is evidently entering upon a useless campaign to recapture lost patronage and gain some of that which has naturally developed in Elkhart, Ind. A few years ago the Central Union apparently lost all interest in the Elkhart field and virtually surrendered to its rival, the Home Telephone Company. As the latter company thrived and installed improvements commensurate with the importance of the city and its business demands the Bell Company was apathetic and did not seem to care whether the public was friendly to it. Now it proposes to institute a vigorous campaign to regain lost ground. Just what methods will be adopted to secure this business is not certain, but it has been intimated that a possible warfare of rates might be expected. The people, however, can not be influenced by temporary cheap rates, the arrogant treatment and lack of local interest manifested by the Bell Company previous to the advent of the Home Company is too fresh in their minds to give them the least encouragement.

OPENING OF A NEW EXCHANGE.

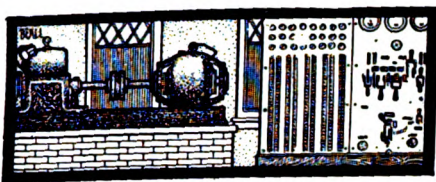
THE Southern Telephone and Telegraph Company opened their new telephone exchange at Hot Springs, Ark., last week. This is one of the most progressive telephone companies in the Southwest, and is constantly increasing its number of patrons. The new directory just issued shows a list of nearly

Second.—The ordinance which was reconsidered and passed had not been previously referred to a proper committee, but was reconsidered and passed the same night without reference.

Third.—The required bond was not filed and approved within the required time.

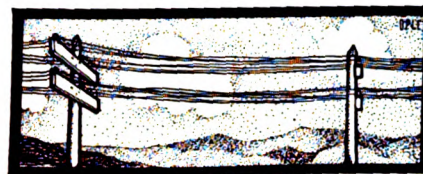
Fourth.—That due notice of the acceptance of the ordinance was not given to council, the terms of which required acceptance in writing within 30 days.

Fifth.—That work was not begun on the erection of the line of the defendant telephone company in Greensburg within three months after the passage of the ordinance, and that after the said three months had elapsed, the company began the erection of its line without any right or privilege.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



IMPEDANCE COILS IN SIMPLEX CIRCUITS.—(334.)

In diagrams that I have seen in your paper, coils that they call "impedance coils" are arranged as the sketch shows at *A* and *B*. Now the descriptions say that these offer high "impedance" to the currents from telephones 1 and 2, but only offer "ohmic resistance" to currents from 3 and 4. If this is so, will you explain why?
M. A. C.

The coils in question are provided with two windings of equal number of turns, wound in the same direction and over the same core. In order to be balanced these windings are wound parallel or concentric, the former being preferable as the resistance of each winding and the positions of the turns are the same.

The actual connection of the coils *A* and *B* in the circuit, Fig.

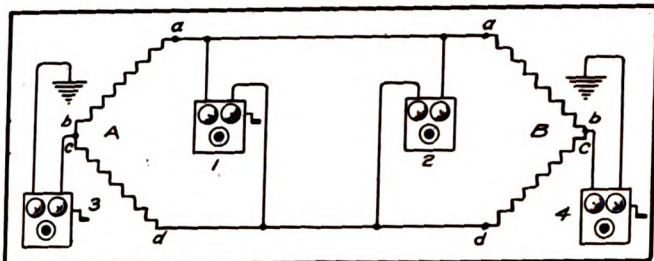
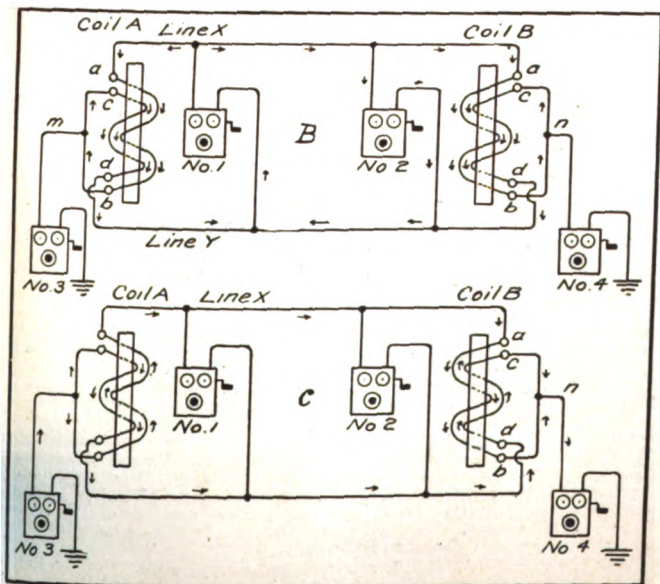


Fig. 334a.

334a are shown in Figs. 334b and 334c. Now if an impulse of voice current, set up in Telephone No. 1, Fig. 334b, passes to line *x* it will have two paths, one through Telephone No. 2 and back to No. 1, by way of line *y*, and the other through the coils. The arrows show the path of this current through the circuit and also through the turns of the two windings of the coils. The current in the two windings of the coils being in the same direction they will act as "impedance" and prevent the voice fluctuations from passing through the coils from line *x* to line *y*, or from line *x* and line *y* to the middle point of the coils, *m* or *n*.

Fig. 334c shows the conditions when an impulse of voice current is set up at Telephone No. 3. This current is divided at *m*, one-half going through one winding of coil *A* to line *x*, and the other half through the other winding of coil *A* to line *y*. After passing



Figs. 334b and c.

through the two windings of coil *B* the current is united at *n*, and completes the circuit through Telephone No. 4 and ground back to Telephone No. 3.

It will be noticed that the current in one winding of coil *A* is opposed by the current in the other winding, thus neutralizing the magnetic effect or retardation. The potential of this current is the

same in both lines *x* and *y*, so that the bridged telephones, No. 1 and No. 2, will not be affected. The retardative effect of the current in coil *B* will also be neutralized, as in coil *A*. The coils *A* and *B* will therefore only offer "ohmic resistance" (the actual resistance of the wire in the coils) to the current between telephones No. 3 and No. 4.

HOW A RECEIVER OPERATES.—(335.)

Will you please explain how a telephone receiver operates? T. A.

The explanation of the operation of a telephone receiver is something as follows: The transmitter impresses upon the line a series of electrical waves, which resemble in shape and amplitude the voice waves which have excited the transmitter. As these waves pass over the line they traverse (see Fig. 335) the wires *L* and *L'*, which conduct them to the coils at the end of the receiver.

diaphragm is situated directly in front of this core, and consequently the diaphragm is in a magnetic field which varies in accordance with the line currents, and, consequently, with the

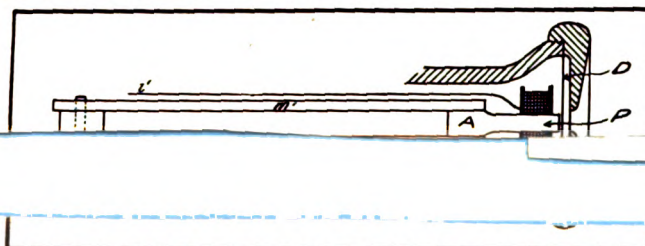


Fig. 335.

vocal waves in the transmitter. This varying magnetic field exercises a varying pull on the diaphragm and causes it to swing to and fro. As the diaphragm moves it sets the air in front of it in motion, and this reproduces on the receiving end sound waves which are identical with those absorbed with the transmitter.

CONDUCTORS IN VARLEY LOOP TEST.—(336.)

In using the Varley loop test, as in diagram Fig. 888, and the equation $x = \frac{I - R}{2}$ with arms *A* and *B* balanced, is it necessary that the good wire should have the same resistance per foot as the wire under test? H. C. T.

It is not necessary that a good conductor should be of exactly the same size as the one under test, though if it is not, consider-

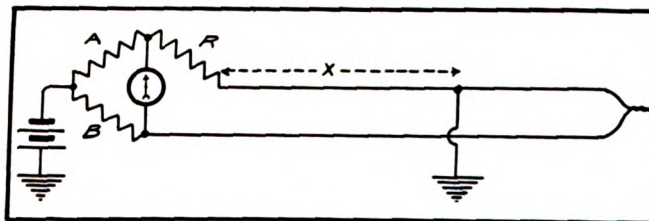


Fig. 336.

able complexity with the formula is introduced. For each individual case, where there are different sizes of conductors introduced, a special formula should be calculated.

BUSY BACK.—(337.)

What is a busy back?

T. E.

A busy back is a contrivance which is arranged for the purpose of signalling automatically to subscribers to indicate that the party that they desire is engaged in conversation. The busy back is usually some form of commutator which is attached to the ringing generator, or so designed as to give a buzz or hum. The operator sends the busy back signal by placing the connecting plug in a jack to which the busy back is attached.



THE WEEK'S MESSAGES

FINANCIAL

JACKSONVILLE, ILL.—The stockholders of the Illinois Telephone Company, at a meeting in this city, voted to increase the capital stock by \$400,000, making the total capitalization \$500,000.

BLOOMFIELD, IND.—The new Home Telephone Company of this city has authorized the issuance of preferred stock to the amount of \$100,000. The income from the sale of stock will be used to extend the lines and improve the plant by installing modern equipment.

KANSAS CITY, KANS.—The Western Independent Telephone Company has filed a deed of trust for \$1,500,000, which will be covered by 6 per cent. first mortgage gold bonds, payable in 20 years, to be issued to enable the company to pay for the extension of its service.

PLYMOUTH, MASS.—At a recent meeting of the directors of the Cape Cod Telephone Company, a dividend of 6 per cent. was declared and the capital stock increased \$3,000. The increase being expended to construct new lines.

ST. ATTENBURY, MO.—The Clinton County Mutual Telephone Company has increased its capital stock to \$50,000.

NEB.—The German Independent Telephone Company has increased its capital stock to \$5,000.

BEREA, OHIO.—The Citizens Telephone Company, of Berea, has increased its capital stock from \$40,000 to \$50,000. H. E. Bolles is president and R. S. Goss, secretary.

CLEVELAND, OHIO.—The Citizens' Telephone Company, of Cleveland, has increased its capital stock from \$40,000 to \$50,000. H. E. Bolles is president.

CLEVELAND, OHIO.—Gross receipts of the United States Telephone Company for March were \$35,417.90; expenses, \$19,417.54; surplus, \$6,398.93. The average monthly surplus last year was \$3,142.18, and it will be seen that the March surplus has doubled this.

SUMPTER, S. C.—The Sumpter Telephone Manufacturing Company has doubled its capital stock by the issue of \$50,000, for the purpose of further enlargement of the plant.

FRANCHISES

RIVERSIDE, CAL.—The Home Telephone Company has applied to the Board of Trustees for a franchise.

OTTAWA, CANADA.—The Bell Telephone Company will not accept the offer of the Ottawa city council of five years' exclusive franchise, provided the company put in house telephones at \$23, instead of \$25, and charge only \$5 additional for a desk extension where a wall telephone is installed.

BOULDER, COLO.—The city council has granted a telephone franchise to Charles C. Townsend, of Greeley.

ALTON, ILL.—The Farmers' Independent Telephone Company will ask for a franchise to extend its system into Upper Alton.

EVANSVILLE, IND.—The Citizens' Telephone Company recently incorporated has been granted a franchise by the city council.

WHITE BEAR LAKE, MINN.—The Village Council has granted a franchise to the Twin City Telephone Company to introduce their system in this village.

TILTON, N. H.—The Citizens' Telephone Company has been granted a franchise to construct its lines to Northfield Center.

AKRON, N. Y.—The Board of Trustees has granted a franchise to the Citizens' Telephone Company, a company just organized by J. W. Stearns, R. H. Bell, E. R. Ford, F. M. Stage, James E. Paxon and D. Eckerson.

MONTGOMERY, N. Y.—The Highland Telephone Company will apply for a franchise for the right to erect poles and wires.

OWEGO, N. Y.—Lyman T. Stamborough, Ward Decker, Fred Ford and John T. Gorman, of Owego, and Nelson P. Brink, of Binghamton, have applied to the city council for a franchise for an Independent telephone system. In case the franchise is granted a stock company will at once be organized.

TONKAWA, OKLA.—The Farmers' Mutual Telephone Company of Tonkawa has been granted a franchise at New Kirk.

ROSCO, PA.—The Union Telephone Company of California was granted a franchise to erect poles and wires through Rosco.

SCRANTON, PA.—The Anthracite Telephone Company has been granted a franchise by the council at Forest City.

KANSAS CITY, MO.—At a meeting of the stockholders of the Home Telephone Company held in St. Louis recently it was decided to vote \$1,500,000 bonds for toll lines. Connections are now made with most of the Kansas points, and the line to Sedalia will be opened in a few days, which will give connection with Jeffersonville City, St. Louis, Joplin, Carthage, Nevada and Webb City, Mo., and Pittsburg, Kansas. Within a very short time the

line to Olathe and other Southern points will be completed, and by the middle of May connections will be made with Leavenworth, Atchison and St. Joseph.

ELECTIONS

SLOAN, IA.—The Sloan Telephone Company has elected the following officers: W. D. Buckley, president; G. D. Montross, vice-president; A. L. Calderhead, secretary; F. O. Hendee, treasurer; J. M. Whitten, director.

FONDA, IA.—The Northern Telephone Company, of Fonda, has elected the following officers: L. S. Straight, president; L. A. Rothe, vice-president; M. G. Coleman, secretary; A. S. Wood, treasurer; George Sanborn, director.

GUTHRIE, ILL.—The Farmers' Mutual Telephone Company has elected the following officers: W. J. Poplett, president; W. M. Cleary, vice-president; Robert Reynolds, secretary and treasurer. Several improvements were voted on.

HARVARD, ILL.—At the annual meeting of the Harvard Telephone Company, F. F. Axtell submitted a report showing the company to be in a very satisfactory condition. F. F. Axtell's term has expired, and he was re-elected director of the company. A dividend of 10 per cent. on the stock was declared.

PEORIA, ILL.—The Home Telephone Company has elected the following officers: Eugene Smith, president; M. J. Gorkman, vice-president; T. C. Fleming, treasurer; T. N. Plottenburg, secretary and manager.

FULTON, IND.—At a meeting of the Fulton Telephone Company the following officers were elected: George Rentschler, president; H. L. Becker, secretary and superintendent, and E. E. Jackson, treasurer.

RISING SUN, IND.—The Cecil Farmers' Telephone Company has elected the following officers: Elwood Balderston, president; Alfred McVey, vice-president, and Cecil E. Ewing, secretary and treasurer.

MANCHESTER, N. Y.—At the annual meeting of the stockholders of the Red Jacket Telephone Company the following officers were elected: Carlos P. Osgood, president and general manager; R. B. Peck, vice-president; W. C. Ellis, secretary and O. S. Titus, treasurer.

COMBINATIONS

MT. CARROLL, ILL.—Stockholders of the several different telephone lines leading from Mt. Carroll have combined their interests in the Farmers' Mutual Telephone Company of Mt. Carroll.

CHETOPA, KANS.—The Chetopa Telephone Company has been sold out to a new concern known as the Farmers' Co-operative Telephone Company.

EVART, MICH.—The Citizens' Telephone Company of Evart has been sold to the Citizens' Telephone Company of Grand Rapids.

KENOSHA, WIS.—The deal is pending the sale of the property of the Pleasant Prairie Telephone Company in this county to the Citizens' Telegraph and Telephone Company of this city.

PERSONAL

JOHN H. CORCORAN, division superintendent of the Sunset Telephone company, and a switchboard expert has been in Olympia, Wash., in regard to telephonic matters.

H. A. DOUGLAS, manager at Jackson, Mich., for the Citizens' Telephone Company for the past three years, has resigned on account of his health, and will go to Redding, Cal.

AUSTIN L. HATCH, superintendent of the Colorado Telephone Company at Canon City, Colo., has been sent to Trinidad owing to the illness of Manager C. E. Stratton. Mr. Hatch is succeeded by Charles A. Van Gallow, of Denver.

T. S. LANE, the manager of the Inter-Ocean Telephone Company of Buffalo, has represented his company in a traffic agreement with the Dundee Telephone Company.

FRANK W. PLANE has resigned his position with the Central Union Telephone Company as its manager at Belvidere, Ill. He will be succeeded by Andrew Birket, who has been Mr. Plane's chief assistant for some time.

H. H. ROBINSON, formerly general manager of the United States Telephone Company, of Cleveland, and later general manager of the Illinois Telephone & Telegraph Company, of Chicago, has been made superintendent of the Michigan State Telephone Company.

WILLIAM F. STAUFFER, secretary and general manager of the Enterprise Telephone Company, New Holland, Pa., has resigned and is succeeded by E. H. Martin.

W. H. WALKER has been appointed manager of the Southwestern Company's exchange at Orange, Tex.

MISCELLANEOUS

MENA, ARK.—The Kizer Telephone Company, of this city, which has a capital stock of \$50,000, has been granted a permit to do business in Texas.

GOSHEN, IND.—The Middlebury Telephone Company has a new line in

OUR "FOLLOW-UP"

is not a mere perfunctory request to the Railway agent to "trace" your car of Poles.

We see that every railroad that gets the car pushes it along.
(Plenty other good points on which to base our request for your inquiries.)
May we not hear from you?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.
Pittsburgh Agents, **TIPPER & PATTON, 512 Bessemer Building.**

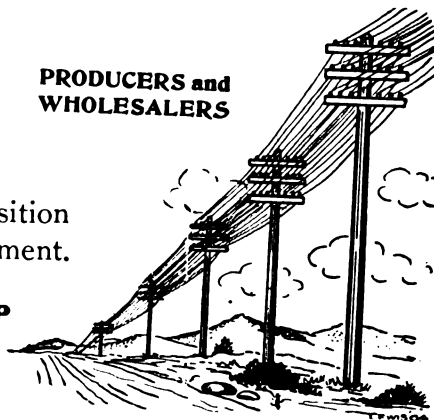
PITTSBURG & LAKE SUPERIOR IRON CO.,
ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.



"From the Stump
to the Line."

PRODUCERS and
WHOLESALEERS



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.




LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



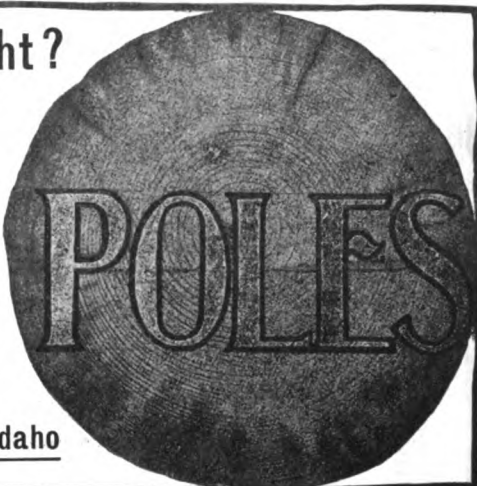
Are You Buying Poles Right?

Are You SURE You ARE?

When in doubt—write us

We are producers on a large scale and have ready for immediate shipment a large stock of all sizes of fine grade Cedar Poles, and the price is strictly right. Ask us for quotations—it may save you many dollars.

Sand Point Cedar Co., Sand Point, Idaho



Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal Articles published by the Engineering Press of the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

The Valentine-Clark Co.

Begin to announce to users of . . .

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Standard Underground Cable Co. 12
Standard Vitrified Conduit Co. 36
Stanton, L. W. 34
Sterling, W. C., & Son 33
Sterling Electric Co. 11
Stromberg-Carlson Telephone Mfg. Co. 4
Swedish-American Tel. Co. 12
Telephone Printing Co. 34
Valentine Clark Co. 30
Vought-Berger Co. 7
Wanted, Situations, etc. 336
Weston Electrical Instrument Co. 34
Wisconsin Timber & Land Co. 33
Worcester, C. H., Co. 29
Yesbera Mfg. Co. 29

ATTORNEYS.
Munk, Otto, New York City.

BATTERIES.
Electric Appliance Co., Chicago, Ill.
Nungesser Electric Battery Co., Cleveland, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

BLANKS, BOOKS AND FORMS.
Telephone Printing Co., Defiance, Ohio.

BONDS.
J. W. Middleton & Co., Chicago, Ill.

BRASS.
Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

BOOTHES.
Yesbera Mfg. Co., Toledo, O.

CABLES.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.

Okonite Co., New York.
Roebbing's Sons Co., John A., Trenton, N. J.
Standard Underground Cable Co., Pittsburg, Pa.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CABLE HANGERS.
Bissell Co., The F., Toledo, O.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Telephone Supply Co., Cleveland, O.
Standard Underground Cable Co., Pittsburg, Pa.

CABLE SLEEVES.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.

CARD INDEX SYSTEMS.
Telephone Printing Co., Defiance, Ohio.

CIRCUIT CLOSERS.
Garton-Daniels Co., Keokuk, Ia.

CLIMBERS.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

CONDUITS.
American Conduit Co., Chicago, Ill.
American Vitrified Conduit Co., New York.
Camp Co., The H. B., New York.
Gest, G. M., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Standard Vitrified Conduit Co., New York.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.

CONNECTORS.
Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.

CONTINUED ON PAGE 31.

YELLOW PINE CROSS ARMS

WE MAKE 'EM

AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SIDES	
Dennis.....	2	2 ft. 8 in.	3	26		9 cts.
Derby.....	4	3 " 6 "	3	16	10	11 "
Dexter.....	6	5 " 2 "	3	16	10	15 "
Dryden.....	8	6 " 10 "	3	16	10	21 "
Dundee.....	10	8 " 6 "	3	16	10	26 "
Duston.....	12	10 ft.	3	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.

CHATTANOOGA, TENN., U. S. A.

ADVERTISERS

THE American Telephone Journal has the widest circulation among people who buy telephone material of any other publication. These buyers read it, and patronize its advertisers. Should you not secure a share of their trade?

Copy for advertisements should be in New York Office not later than Tuesday noon preceeding date of publication.

American Telephone Journal

ADVERTISERS' DIRECTORY—Continued

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Erner Hopkins Co., Columbus, O.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Leslie, A. C., & Co., Montreal, Can.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Townsend Cedar & Supply Co., Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LATHES.

Scribner, A. C., Gloversville, N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MAGNETS.

Leslie, A. C., & Co., Montreal, Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Western Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

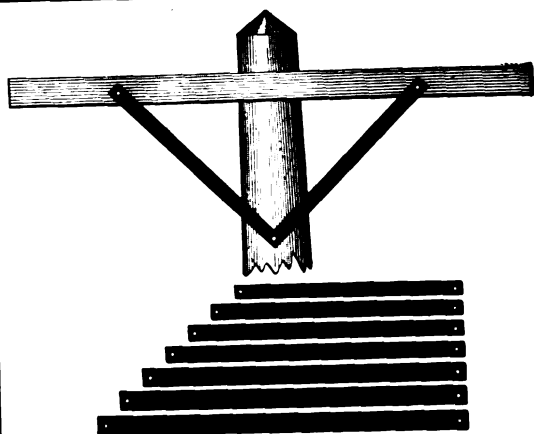
PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Lipsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co., Mattoon, Wis.
Worcester, C. H., Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

THE STEEL MADE AND ALL THE
WORK DONE AT OUR OWN PLANT.

All Sizes

Quick Shipment

Plain and Galvanized

INLAND STEEL COMPANY

FIRST NAT'L BANK BLDG. 1

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

American Telephone Practice

By KEMPSTER B. MILLER, M. E.

518 large pages, profusely illustrated with 380
diagrams and cuts of apparatus

\$3.00

A book for the telephone man. It is an encyclopedia of useful information concerning telephony. It gives complete specifications, enabling you to intelligently order apparatus from manufacturers, and to properly supervise the installation of an exchange, large or small.

It describes in simple language the theory and practice of modern telephony, including circuits, mechanical construction and operation of telephones and switchboards.

A complete description is given of storage batteries, their care and maintenance; of aerial and underground line construction, and, in fact, all the important matters which telephone men need to know.

Sent Prepaid on Receipt of Price by AMERICAN TELEPHONE JOURNAL

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO., MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Pendleton & Gilkey

816 Lumber Exchange,
Minneapolis, Minn.

POLE PRODUCERS.

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

Cost of Construction Reduced

By Purchasing Chestnut Telephone

POLES and POSTS

From FRANK MULLEN, Ewing, IND.

Reasons Why for the Asking

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES

For Special Use Carried in Full Stocks and
Sold at Reasonable Prices

THE MEDORA MILLING CO.,
MEDORA, INDIANA

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG,
INDIANA.

E. CHURCHILL

HERON, MONT.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:

Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho
Chicago, Ill.

FRANCIS
BEIDLER
& CO.

459-519 W. 22d St.
CHICAGO, ILL.

We Rush Orders...

COHN & BOCK

YELLOW PINE • CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American
Telephone Journal

116 Nassau Street,
New York City.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART, cross ties, oak and locust pins and brackets. Write us for delivered prices.
R. R. ARMS, Manager.

LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

A Salesman

costs you lots of money. He covers a limited territory only.


An Ad

doesn't cost much, and covers the whole territory. Write for prices.

THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., City of New York.

23 Years' Experience Guarantees Satisfaction.
WRITE YOUR WANTS TO

CHICAGO
Telephone Apparatus Exchange
TELEPHONE ACCESSORIES
BOUGHT, SOLD AND EXCHANGED
17 S. Elizabeth Street, CHICAGO, ILL.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.
167 Dearborn St.

Do you always mention the
American Telephone Journal
when writing to advertisers? It will be
appreciated by all concerned if you do.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR**
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

**Blank Books and Forms
FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.**

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

Tell the Advertiser you saw his
announcement in

**The American
Telephone Journal.**

Protect the Base of Your Poles

Your Crossarms and Pins against rot and decay by a judicious use of the original *S. P. F. Carbolineum*. 25 years' record. For particulars address

BRUNO GROSCHÉ & CO., - 27 William St., NEW YORK

The Erner Hopkins Co.

**Wholesale
Electrical
Supplies**

WRITE US FOR PRICES.

WE CAN SAVE YOU MONEY.

the ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.

Manufacturers of BARE and TINNED

COPPER WIRE

Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.

ROME, N. Y.

Chicago Office: 1501 Monadnock Bldg.,
CHICAGO.

Keeling & Ridge Co.

General Contractors

Builders of Telephone and Telegraph Lines, Electric Railroad, Power Lines, etc. Conduit Work a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL. \$250,000.00.

Main Offices, 851-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Millammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLT-METERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Co.,

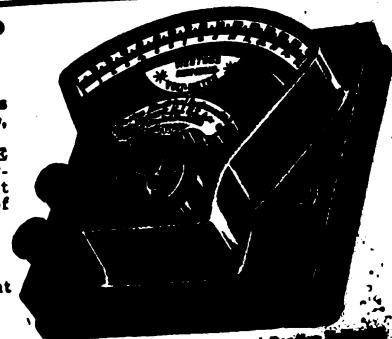
Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument Co. Ritterstrasse, No. 38.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS—FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

**Linemen's Outfits
Construction Tools**

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

OUR BOOK OFFERS

We sell all books on the Telephone, Telephony or kindred subjects. Below will be found a partial list from which you may make your selection.

Mark an X before the book you want. Cut this out and mail it to us with the amount stated, and the order will be promptly shipped.

A B C of the Telephone.....\$1.00 By J. E. Homans.	The Magneto Hand Telephone.....\$1.00 By Norman Hughes.
Diagrams of Electrical Connections......50	Telephone Hand Book.....\$1.00 By Herbert Laws Webb.
Induction Coils.....\$1.00 By H. S. Norrie.	Practical Electrica. This volume could rightly be called an Electric Encyclopedia......75
Cushing's Standard Wiring.....\$1.00 By H. C. Cushing, Jr.	Systematic Treatise on Electrical Measurements..... By H. C. Parker.
Arithmetic of Electricity.....\$1.00 By T. O'Connon Sloan.	Practical Telephony.....\$1.00 By J. Bell and S. Wilson.
Telephone Lines and Their Properties.....\$1.50 By W. J. Hopkins.	Electrical Catechism.....\$2.00 By George D. Shepardson.
Patented Telephony: A Review of Patents Pertaining to Telephones and Telephonic Apparatus.....\$1.50	American Telephone Practice.....\$3.00 By Kempster B. Miller.
The Electric Telephone.....\$6.00 By G. B. Prescott.	How to Make and Use the Telephone.....\$1.00 By George H. Cary.
The Inspector and Troublemaker.....\$1.00 By A. E. Dobbs.	The Telephone......50 By Prof. A. E. Dolbear.
Telephones: Their Construction and Fitting.....\$1.25 By F. C. Allsop.	The Telephone, the Microphone and the Phonograph..... By Count Dumoncel.
Practical Features of Telephone Work......75 By A. E. Dobbs.	Practical Information for Telephonists..... By T. D. Lockwood.
The Storage Battery.....\$1.75 By Augustus Treadwell, Jr., E. E.	Elementary Treatise on Electric Batteries.....\$2.50 By A. Niandet. Translated by L. M. Fishback.
Small Accumulators......50 By Percival Marshall.	Storage Battery Engineering.....\$3.00 By Lamar Lyndon.
The Galvanometer and its Uses.....\$1.50 By C. H. Haskins.	Conduits for Telephone Work..... By Arthur Vaughan Abbott.
Induction Coils.....\$1.00 By G. E. Bonney.	Primary Batteries: Their Construction and Use.....\$4.00 By W. R. Cooper, M. A.
Electric Telephony.....\$1.00 By E. J. Houston and A. E. Kennelly.	Patents and How to Make Money Out of Them.....\$1.25 By W. B. Hutchinson.
Electric Instrument Making for Amateurs......50 By S. R. Bottone.	Wireless Telegraphy.....In Press. By C. H. Sewall.
Telephone Troubles and How to Find Them......25 By W. H. Hyde and J. H. McManman.	A Practical Treatise on Lightning Protection.....\$1.00 By Henry W. Spang.
The Telephone.....\$1.00 By William J. Hopkins.	A Practical Guide to the Testing of Insulated Wires and Cables.....\$1.00 By Herbert Laws Webb.

*Prices will be furnished upon application.

If you are interested in this offer, and want any further description of the various books, write us a letter and it will have our prompt attention.

The American Telephone Journal

116 Nassau Street,
CITY OF NEW YORK



California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.

THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.

THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.
W. B. KNISKERN,
Passenger Traffic Manager,
Chicago.

To Upper Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway.

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,
CHICAGO, ILL.


Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.



P. S. EUSTIS,

Passenger Traffic Manager
P4 CHICAGO.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

**39-41 Cortlandt Street,
NEW YORK.**

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

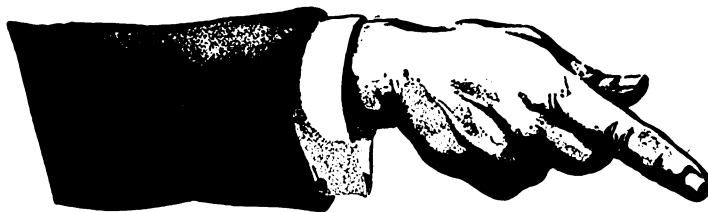
Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
 Street Address _____
 Town _____ State _____

American Telephone Journal
 116 Nassau Street, New York City
 Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.

ADVERTISERS' DIRECTORY—Concluded

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Fostoria Electric Supply Co., Fostoria, Ohio.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.

Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.

Chicago, Burlington & Quincy Ry. Co.

SEALS.

Middleton & Co., J. W., Chicago, Ill.

STATIONERY.

Gildart Bros., Albion, Mich.
 Telephone Printing Co., Defiance, Ohio.

STEEL.

Leslie, A. C., & Co., Montreal, Can.

STOCK CERTIFICATES.

Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.

National Battery Co., N. Y. City.

SWITCHBOARDS.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Conn. Tel. & Electric Co., Meriden, Conn.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Ericsson Telephone Co., N. Y.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.

Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Chicago Telephone Apparatus Exchange, Chicago, Ill.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 De Veau Telephone Mfg. Co., New York.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnestock Transmitter Co., New York.
 Hipwell Mfg. Co., Allegheny, Pa.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Telephone Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.
 Western Tel. Mfg. Co., Chicago, Ill.

TELEPHONE BLANKS.

Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.

Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.

Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Barr, W. J., Mfg. Co., Cleveland, Ohio.
 Bissell Co., The F., Toledo, O.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Chicago Telephone Apparatus Exchange, Chicago, Ill.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 De Veau Telephone Mfg. Co., New York.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnestock Transmitter Co., New York.
 Hipwell Mfg. Co., Allegheny, Pa.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Leslie, A. C., & Co., Montreal, Can.
 Monarch Tel. Mfg. Co., Chicago, Ill.

Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Yesbera Mfg. Co., Toledo, O.

TERMINALS.

American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 McIntire Co., C., Newark, N. J.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.

Gildart Bros., Albion, Mich.
 Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.

Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.

American Electric Tel. Co., Chicago, Ill.
 Bissell Co., The F., Toledo, O.
 Chicago Insulated Wire Co., Chicago, Ill.
 Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 National Wire Corporation, New Haven, Conn.
 Okonite Co., New York.
 Roebbing's Sons Co., John A., Trenton, N. J.
 Scovill Mfg. Co., Chicago, Ill.
 Spargo, James A., Wire Co., Rome, N. Y.
 Standard Underground Cable Co., Pittsburgh, Pa.

WOOD PRESERVER.

Bruno Grosche & Co., New York.



**Experience
is a wise teacher**
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

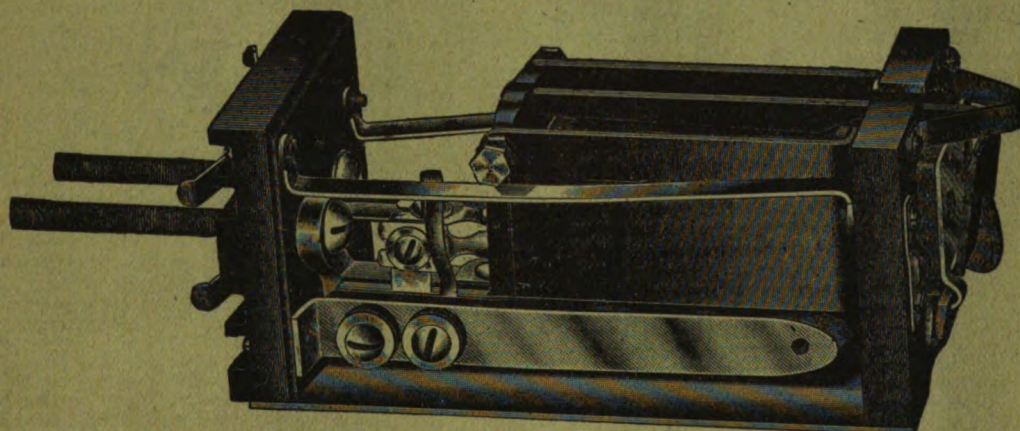
6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

IMPROVED AMERICAN EXPRESS SWITCHBOARDS

BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

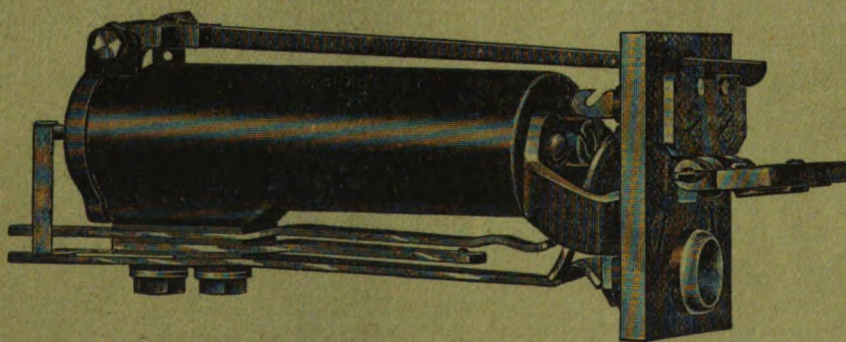
**SELF-CONTAINED DROPS AND JACKS
RAPID RINGING DEVICE**

All drops restored to normal condition by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10.



**AT
POPULAR
PRICES**

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

THE AMERICAN TELEPHONE JOURNAL

READ FOR DIGEST
McDonough.

One Ad Doesn't Make A Customer—

Many manufacturers insert a small advertisement once or twice in a publication "as a trial," and then sit back and wait to see what comes of it.

Nothing—or next to nothing—comes of it, quite naturally.

People who see your advertisement once or twice are just beginning to take note of what you say, and, perhaps, to resolve to give your goods a trial.

The next time they look over their favorite paper, your advertisement isn't there.

Consequently, your rival who advertises steadily and persistently, wins their confidence and gets their trade.

THE AMERICAN TELEPHONE JOURNAL reaches every nook and corner of the telephone trade. When you buy space in it, you buy circulation—paid circulation—the kind you want to reach and who buy.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—MAY 28, 1904—CHICAGO Number 22

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$2.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

KANSAS CITY INDEPENDENT TELEPHONE SYSTEM.....By F. A. Parker
IMPROVEMENT IN MAGNETO SWITCHBOARD SIGNALING.....By J. W. Lattig and Charles Goodrum
INDEPENDENT TELEPHONY IN VIRGINIA.....By J. A. Helvin
TECHNICAL TRAINING SOME SIDE LIGHTS ON THE EVANSVILLE SITUATION

The Operating Field:

INDEPENDENT LONG DISTANCE SERVICE ASSURED
AN IDEAL WAY TO SECURE RESULTS
NEW POWERS FOR TENNESSEE COMPANIES
QUESTION OF RATES IN INDIANA
A NEW PORTABLE TELEPHONE
NORTH DAKOTA TELEPHONE MEETING

THE EVANSVILLE COURIER SUES FOR LIBEL
MICHIGAN COMPANY MEETING
EXTENSIONS BY THE WICHITA, KANSAS, COMPANY
A FLEXIBLE LADDER, By Charles Claydon
A HUSTLING MISSOURI COMPANY
A RATIONAL ANTI-HUM TREATMENT, By J. M. Hall

QUERIES

THE EDITOR'S PAGE

PATENTS.

THE WEEK'S MESSAGES

TRADE NOTES

WANT AND FOR SALE ADVERTISEMENTS, PAGE 353

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first-class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DUNN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

"SPECIAL" Telephone Condensers

The "Special" Condensers are of standard design, and are superior, due to their absolute uniform capacity and ability to stand high voltage without break down.

They are of high insulation resistance.

The "Special" is made to withstand a voltage of 250 volts alternating current indefinitely, without injury or leaking appreciably. The insulation resistance is forty meg-ohms per microfarad, and the greatest variation in capacity will not be over 5 per cent. of the rated capacity.

The "Special" Condenser is neatly and hermetically sealed in metal cases mounted with hard rubber terminals, and tinned brass terminal lugs.

For full information regarding Condensers and about everything else in the telephone line you should have our General Telephone Catalogue No. 19, and Telephone Parts Catalogue No. 21.

Electric Appliance Company,

Telephone Manufacturers.

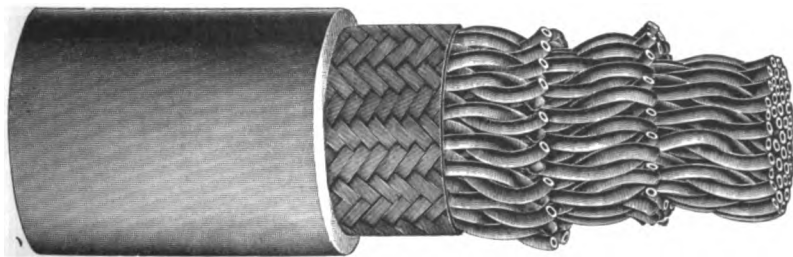
Electrical Supplies.

92 and 94 W. VAN BUREN ST.,

CHICAGO.

WRITE FOR SAMPLE CARD OF WIRES.

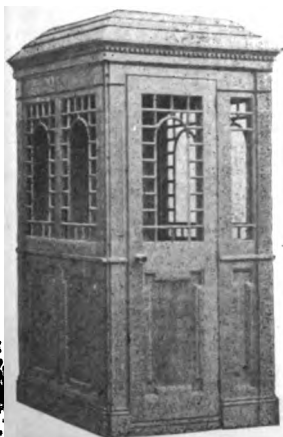
Manufacturers of



"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.



Many people have the Booth habit so grown upon them that they will not use an exposed telephone—Good Habit, too—and should be encouraged by the exchange—for it's a money-making habit for them.

Some Booths are O. K. and some are N. G. When interested in the O. K. kind, write us for catalogues.

YESBERA MFG. CO.
TOLEDO, OHIO



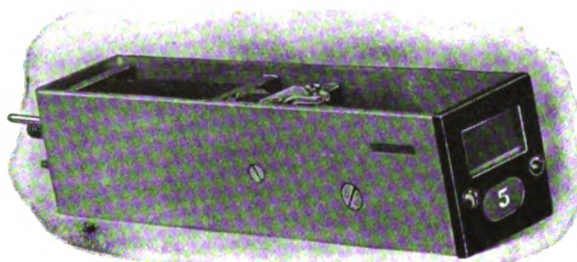
The Recent Patent Decision

does not affect this type of signal built for generator-call or magneto systems. For rapid service it is equal to a lamp signal system and about half as complicated. It is almost as simple as an ordinary tubular drop.

During the past we have sold boards ranging from 50 to 1,000 lines capacity equipped with this type of signal.

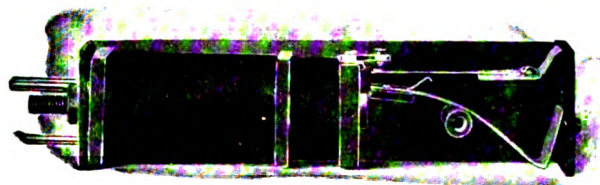
We gladly refer you to companies using them.

**Self
Contained**



COMPLETE LINE SIGNAL.

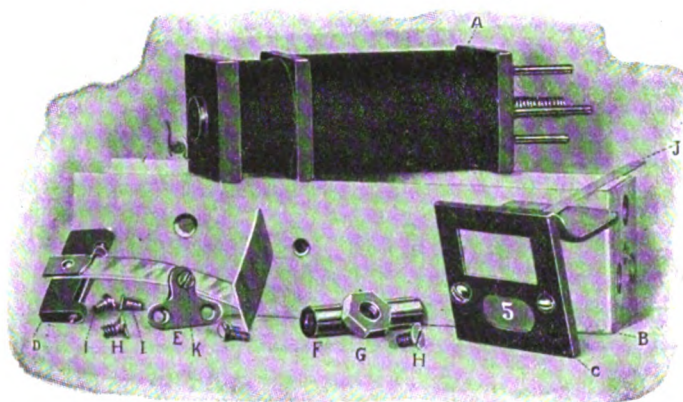
**Easy
to Install**



SIGNAL IN NORMAL POSITION.



POSITION OF SIGNAL AFTER CALLING.



PARTS OF ABOVE SIGNAL.

THEY ARE JUST AS SIMPLE AS THEY LOOK.

The first cost is a trifle more than self-restoring drops but they are well worth the difference, if service counts. We would like to mail printed matter to you describing this apparatus fully.

STROMBERG-CARLSON TELEPHONE MFG. CO.

GENERAL AND EASTERN SALES OFFICE:

Rochester, N. Y.

SALES DEPARTMENT:

Chicago, Ill.

Kellogg Telephone Apparatus



FAIR and away the first in rank and the acknowledged “standard of excellence” throughout the world.

“Of a quality equal to Kellogg” is stipulated in government specifications for telephones and kindred apparatus.

Write for our prices in the magneto line. They are but little higher than the host of makes that claim equal merits.

Kellogg Switchboard and Supply Co.

Green and Congress Streets, Chicago

Reliance Building, Los Angeles

Electric Building, Cleveland
Keystone Telephone Building, Philadelphia



FARMERS' TELEPHONES
AND TELEPHONE SUPPLIES
LINEMEN TOOLS, BATTERIES, WIRE, BRACKETS, PINS,
CROSS-ARMS, BRACES, LAG BOLTS.
Quick Shipments. Prices are Right.
HIGH GRADE TELEPHONES AND SWITCHBOARDS.

FARR TELEPHONE & CONST. SUPPLY CO., CHICAGO.



Exchange Telephones

and Private Line Telephones,
Express Switchboards, Gong
Switchboards, Large or Small
Transmitters, Receivers and
Hooks.

A set of Bookkeeping Blanks and Ledgers Free with a \$10.00 Order.

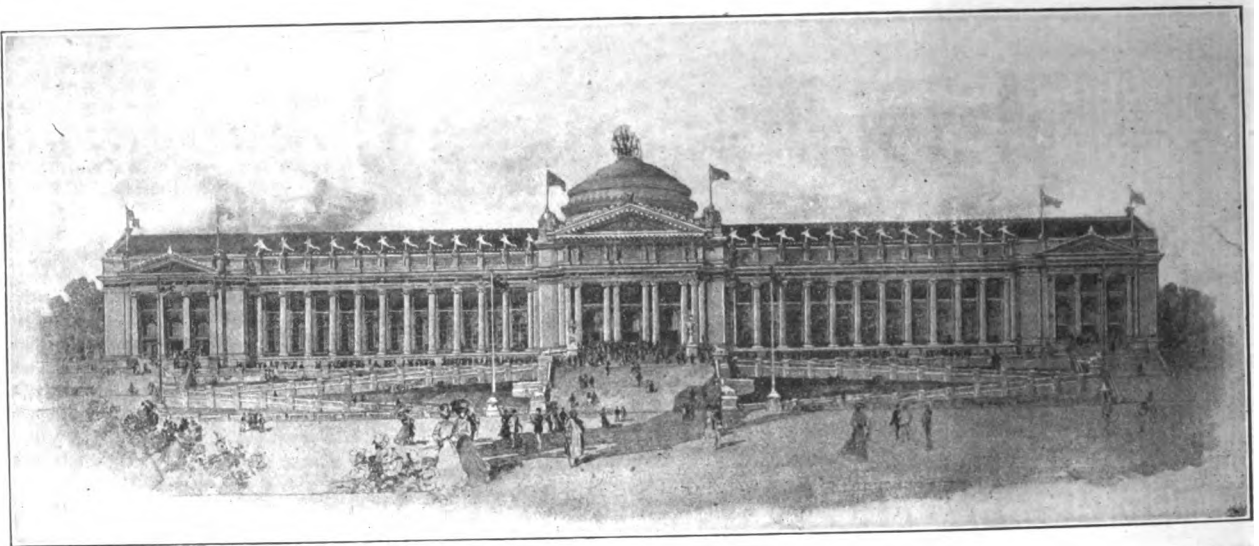


World's Fair Art Catalogue No. 18

NOW READY

Mailed Free on Request

TELEPHONE
INSTRUMENTS



UNITED STATES GOVERNMENT BUILDING.

TELEPHONE
SUPPLIES

Central Telephone and Electric Co., Manufacturers of High-Grade Telephone Apparatus
Dealers in "Everything Used with Telephones" 909 Market Street, St. Louis, U.S.A.

*Our **Automatic Telephone** installation at the St. Louis Exposition is the most remarkable electro-mechanical exhibit at the big show. You will find it in the Palace of Electricity, section 24. Inside this great palace we have built a little palace. You are cordially invited to call.*

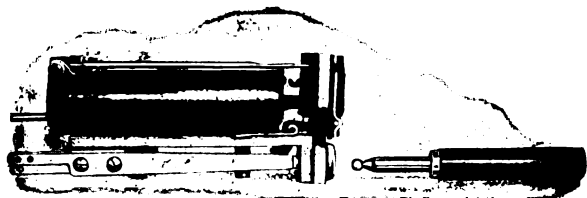
Automatic Electric Company,
CHICAGO, U. S. A.

HIPWELL MANUFACTURING COMPANY,
ALLEGHENY, PA.
High Grade Long Distance Telephone

IN THE "International" SWITCHBOARD

the automatic restoration of the drop is "*Accomplished by means dissimilar to the contact of the plug with the drop as the plug enters the jack.*"

(See the decision)



It Don't Infringe

"International" drop fully protected by patents allowed, and **Guaranteed Absolutely Non-Infringing**

A SAMPLE

will convince you that it is electrically and mechanically perfect

International Telephone Mfg. Co.
Harrison and Clinton Streets, Chicago, U. S. A.

To Annihilate Distance

and thus economize time and effort—that is the principal reason for the universal use of the telephone.

This is accomplished to the last possible degree only by

The Pendent Telephone

which suspends the instrument "at the crook of the elbow," wherever one may be, in the office, factory, shop or residence.

It automatically adjusts itself at any point or to any attitude, and interferes with absolutely nothing except the few molecules it is obliged to displace in the air.

The thirty-day trial we offer will convince anyone that all other telephones lack something.

**THE
Vought-Berger Company**

MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS AND APPLIANCES

LA CROSSE, WIS.



DE VEAU TELEPHONES AND APPARATUS

Highest standard
of workmanship
at pleasing
prices.

Ask about our Testing Set

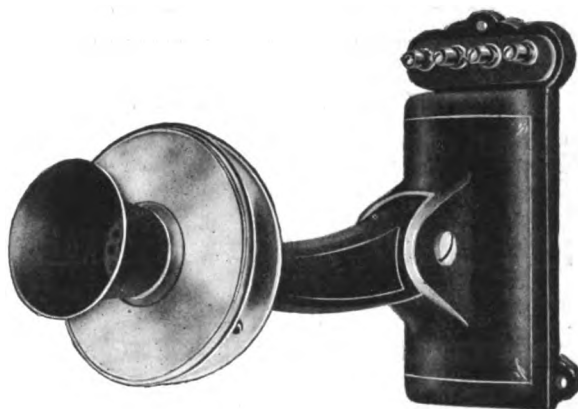
Lightest, most
compact and
durable made.
120-page illus-
trated catalogue
on request. Let
us send you one.

**De Veau
Telephone
Manufacturing
Company**

27 Rose St., NEW YORK

Couch No. 32 Transmitter

UNSURPASSED



Being No. 30 Mounted on No. 320 Adjustable Arm with
Induction Coil in Base.

In a Class by Itself

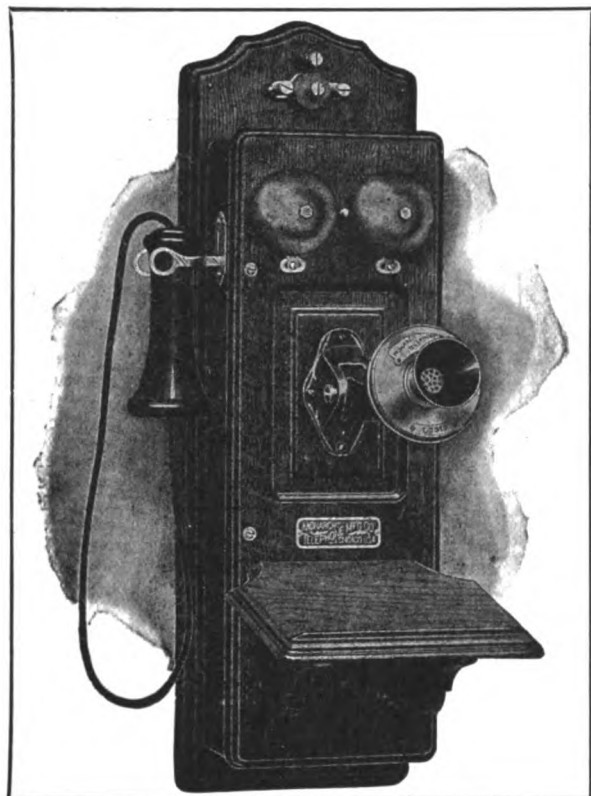
Has been made the same way for years, never necessitat-
ing any change.

Get a sample and play ball with it, or drop it out of the win-
dow, then note how well it will talk.

S. H. COUCH CO.

162 Pearl St.

Boston, Mass.



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

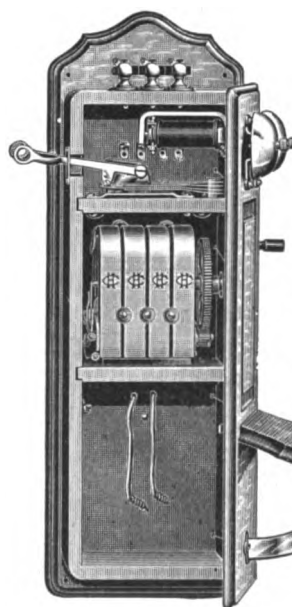
CITY OF NEW YORK

USERS of *Eastern* telephones are enthusiastic as to their merits. Ask us for a list of satisfied customers.

**Eastern Telephone Mfg. Co.,
West Chester, Pa.**

One Word Please

Do you know that
you can buy this

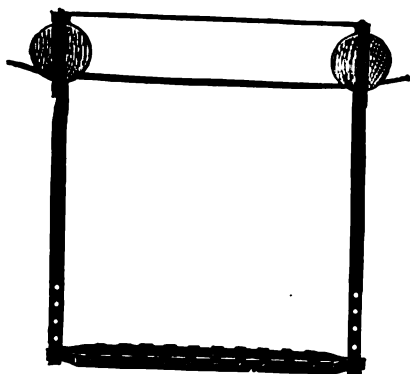


**Compact
Magneto**
and assemble a very
**High-Grade
Telephone**

at a reasonable cost.

☐ Pure platinum contacts on both ringing and talking circuits. ☐ Equipped with those H-C generators and ringers. Write us.

The Holtzer-Cabot Electric Co.
Brookline, Mass. : : : : : Chicago, Ill.

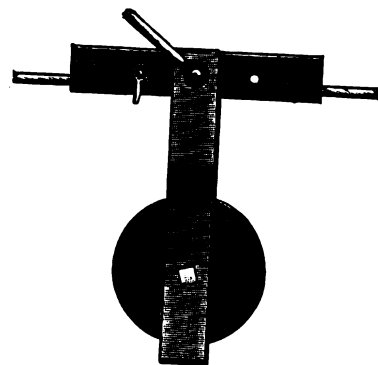
**"Ready" Cable Car**

OUR "READY" CABLE TROLLEY
decreases your cost of stringing cable by
one-half.

OUR "READY" CABLE CAR
has adjustable seat, is strong and light
in weight.

Secure our prices on Cable
and Telephone Supplies

The W. G. Nagel Electric Co.
TOLEDO, OHIO.



Patented December 15, 1903

"Ready" Cable Trolley

ADVERTISERS' DIRECTORY

American Conduit Co.	36	Gest, G. M.	38
American Electric Teleph. Co.	40	Hemingray Glass Co.	6
Am. School of Correspondence	—	Hipwell Mfg. Co.	8
American Vitriced Conduit Co.	39	Holtzer-Cabot Electric Co.	34
Automatic Electric Co.	31	Imperial Finance & Cons. Co.	3
Barr, W. J., Mfg. Co.	33	Indiana Rubber & Insulated Wire	30
Beidler, Francis & Co.	10	Index of the Technical Press	32
Benedict & Burnham Brass & Cop- per Co.	12	Inland Steel Co.	7
Bissell Co., The F.	12	International Telephone Mfg. Co.	34
Bruno Grosche & Co.	12	Keeling & Ridge Co.	5
Bullard & McElligott	34	Kellogg Switchboard & Supply	34
Bushnell, A.	34	Co.	3
Butterfield, J. F.	34	Klein, Mathias, & Sons	12
Cameron Appliance Co.	12	Lanz M., & Sons	3
Camp, The H. B. Co.	39	Leslie, A. C., & Co.	33
Central Mfg. Co.	6	Lewis Lumber & Mfg. Co.	32
Central Telephone & Electric Co.	11	Lindsley Bros. Co.	36
Century Telephone Const. Co.	35	McIntire, C., Co.	29
Chicago, Burlington & Quincy Ry. Co.	—	Maltby Lumber Co.	33
Chicago Insulated Wire Co.	34	Medora Milling Co.	31
Chicago Telephone Apparatus Ex- change	6	Merritt & Co.	33
Chicago Writing Machine Co.	33	Michigan Cedar Co.	34
Churchill, E.	33	Middleton, J. W., & Co.	8
Cohn & Bock	33	Monarch Telephone Mfg. Co.	33
Columbia Mfg. Co.	33	Mullen, Frank	9
Connecticut Teleph. & Electric Co.	33	Munk, Otto	9
Cook, Frank B.	35	Nagel, W. G., Electric Co.	9
Couch, S. H., Co.	7	National Battery Co.	10
Crumb, W. H., Co.	36	National Telephone Supply Co.	10
De Veau Tel. Mfg. Co.	—	National Wire Corporation	2
Dickey Clay Mfg. Co., W. S.	36	New Haven Novelty Machine Co.	—
Eastern Telephone Mfg. Co.	30	Nungesser Electric Battery Co.	6
Electric Appliance Co.	30	Okonite Company	30
Ericsson Telephone Co.	33	Pacific Coast Pole Co.	33
Erner Hopkins Co.	34	Pendleton & Gilkey	32
Fahnestock Transmitter Co.	—	Pignolet, L. M.	29
Farr Tel. & Const. Supply Co.	6	Pittsburg Lake Superior Iron Co.	33
Fowler, John H.	29	Prosser & Son, L.	31
Garton-Daniels Co.	11	Roebbling's, John A., Sons Co.	30
		Sand Point Cedar Co.	2
		Scovill Mfg. Co.	2

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 30.

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Combination Wall and Desk Set



Does away with
the cumbersome
nickel set that's
always in the way
of everybody's
elbow.

Equipped with
our famous hand-
microphone, a
complete instru-
ment within itself.
Can be hung in
any convenient
space, under the
desk, on it, beside
it, or on the wall,
if desired.

Having no hook
in the magneto,

relieves telephone users of a constant source of
annoyance.

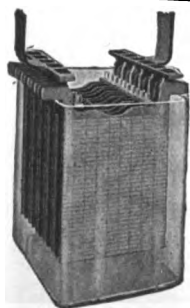
Write today for catalog

ERICSSON TELEPHONE CO.

"INDEPENDENT"

Mfrs. of SWITCHBOARDS, TELEPHONES and TELEPHONE SUPPLIES

296 BROADWAY, NEW YORK, N. Y.



STORAGE BATTERIES

TELEPHONE BATTERIES

UP-TO-
DATE

MUST
HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

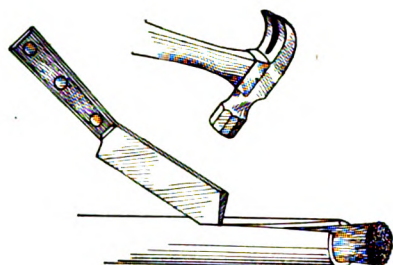
FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

Cable Sheath Knife



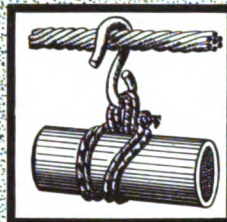
For Splitting Cable Sheath.
Write for Sample and for
Price.

THE F. BISSELL COMPANY

Manufacturers and Jobbers of
TELEPHONE SUPPLIES
226-228-230 HURON STREET

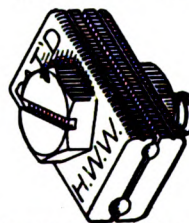
TOLEDO, O.

MARLIN CABLE HANGERS

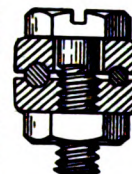


NATIONAL
TELEPHONE
SUPPLY CO.
CLEVELAND

TELEPHONE WIRE TROUBLES AND THE COST OF CLEARING THEM CAN BE GREATLY REDUCED BY USING "H. W. W." WIRE-CONNECTORS



Why make permanent joints at important points in your telephone circuits when a test joint with a thoroughly reliable connector will enable you to test quickly at the cable-box, or at the drop wires—or at intervals on toll wires! The "H. W. W." Connector will fit wires of



the same or of different diameters. It has been extensively used by Telephone Companies for several years. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices: NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

OUR MOTTO
"Standards of Standards"
ALL WE ASK IS
A COMPARISON



100 LINE LAMP SIGNAL MAGNETO BOARD.

Our
LAMP SIGNAL
MAGNETO SWITCH BOARD

With all its latest improvements

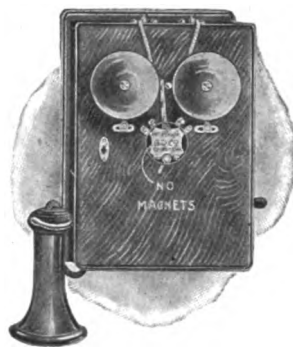
Can Not Be Equalled

Write us for information

Sterling Electric Co.
LAFAYETTE, IND.

Take
A Drop

Put a G. D. Extension Drop on one of your phones. Watch it work for a month. You'll want more of them. Send for sample and pamphlet D6:



GARTON - DANIELS CO., Keokuk, Iowa

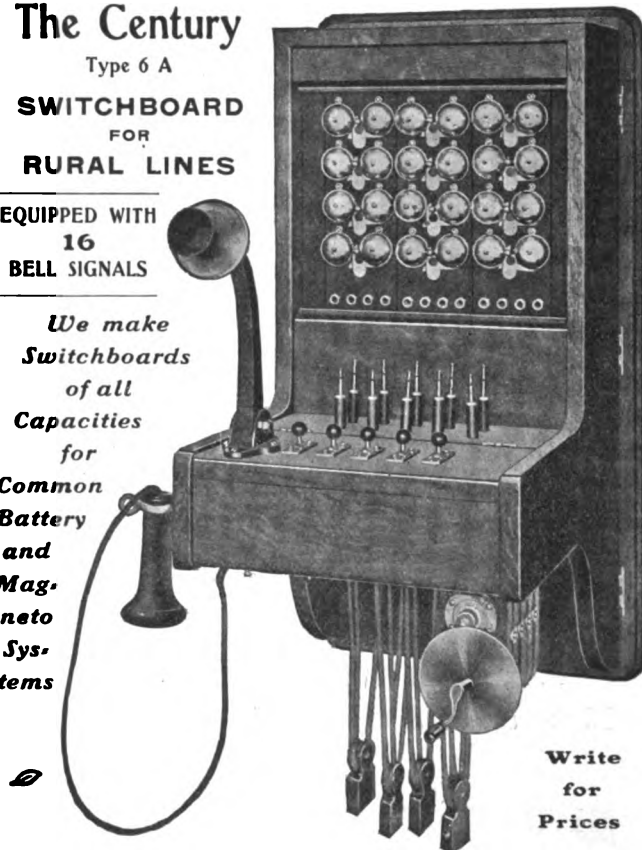
The Century

Type 6 A

SWITCHBOARD
FOR
RURAL LINES

EQUIPPED WITH
16
BELL SIGNALS

We make
Switchboards
of all
Capacities
for
Common
Battery
and
Magneto
Systems



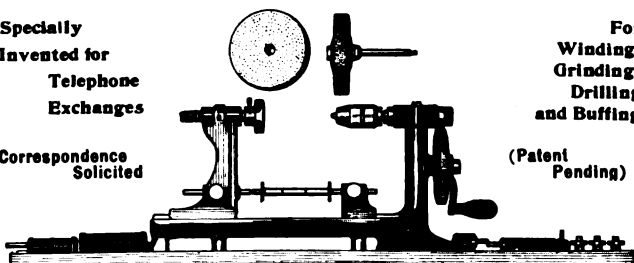
Write
for
Prices

CENTURY TELEPHONE CONSTRUCTION COMPANY
586 Ellicott Square, BUFFALO, N. Y.

THE EUREKA COMBINATION BENCH LATHE

Specially
Invented for
Telephone
Exchanges

Correspondence
Solicited



For
Winding,
Grinding,
Drilling
and Buffing

(Patent
Pending)

A. C. SCRIBNER, MFR.,
GLOVERSVILLE, N. Y.

In the Life of a Telephone Lies the **PROFIT THEREOF**

How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO

Protect Base of Poles

your crossarms and pins against dry and wet rot, by a judicious use of **S. P. F. Carbolineum**, and

You will have no breakdowns

Cost all told less than 15 cts. per pole. Twenty-five years' record.

BRUNO GROSCHÉ & CO.

27 William Street, New York.

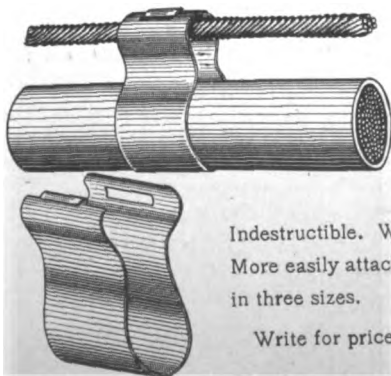


M. LANZ & SONS,
PITTSBURGH,
PA.

PLAIN
AND
GALVANIZED

Telephone and
Telegraph Line Material

Manufacturers
of



The Pittsburgh Cable Clip

Indestructible. Will not slip on or cut cable. More easily attached than any other. Made in three sizes.

Write for prices and particulars.

BULLARD & McELIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.

Send for Sample of our

\$3.50 HOUSELINE Cable Clip

It LOOKS as good, and WHEN NEW tests nearly as well as our Standard Article and is better than many offered by irresponsible infringers of our Patent at higher prices.

Cameron Appliance Company
89 STATE STREET, BOSTON, MASS.

Subscription price, \$1.00 a year. Foreign countries, \$3.00 a year. Single copies, 10 cents.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, MAY 28, 1904

NUMBER 22

INDEPENDENT TELEPHONE SYSTEM OF KANSAS CITY

By F. A. PARKER.

FOR a long while the telephone service of Kansas City had been notorious. So bad had it become that it attracted the attention of some of the most prominent people in the Independent telephone field. The result of an investigation of the conditions resulted in the granting of a franchise and the subsequent building of the model plant herewith described. Kansas City, Missouri, and Kansas City, Kansas, lie side by side, only being separated by an imaginary line, and their combined population is about 300,000. Of this number 9,000 are already subscribers to the service of the Home Telephone Company, which began operations the first part of this year. At the present time the Independent telephones are being installed at the rate of forty per day, and so great has been the demand for them, that it has been found necessary to order extensions for the switchboards, of both the main and branch exchanges.

When the Home Telephone Company was organized, it was not thought that they would be able to get into Kansas City without a big fight for supremacy with the Bell company, but the stubbornness of the old company was the making of an easy path for the new, and at this time the subscribers of the old company are steadily ordering their telephones out, and replacing them with the ones of the Home Company. The termination of the business men of the two cities to do away with the Bell telephones has become so marked, that it is no longer a question of soliciting new subscribers, to increase the patronage of the Home Company, but a question of taking care of the business which is coming to them.

Early in 1901, there was quite an agitation in Kansas City for a reduction of telephone rates, or an improvement in the service, or both. The city council passed an ordinance reducing the

rates for telephone service to \$60 for a business telephone and \$36 for a residence telephone. The Missouri & Kansas Telephone Company refused to abide by this ordinance, claiming that the Interstate commerce law covered their case, and that the city had no authority to regulate their charges. Finally a franchise was granted to John Enoch, and this was purchased by the Central Telephone Construction Company, composed of Ed. L. Barber, O. C. Snider, and James S. Brailey, Jr. The city then

felt that it was to have a telephone system, and the construction company began work, having engaged Mr. W. C. Polk as its chief engineer. The financial end of the work was handled by an underwriting syndicate, managed by the Germania Trust Company, of St. Louis, now a part of the Commonwealth Trust Company, and the construction company had full charge of the canvas for subscribers, securing 9,000 contracts signed for a three-year period, without very much trouble.

The Kansas City Home Telephone Company was

incorporated in November of 1901, with a capital stock of \$50,000 which was increased, in January, 1903, to \$3,000,000, of which \$1,700,000 has been issued, along with bonds to the same amount, to secure indebtedness, while the balance of the stock is in the treasury, to provide for future extensions and betterments.

The officers of the company are: J. J. Heim, president; Henry Koehler, Jr., vice-president; O. C. Snider, treasurer and general manager; Hugh C. Ward, secretary. The directors are: J. J. Heim, O. C. Snider, Hugh C. Ward, Walter S. Dickey and J. J. Swofford of Kansas City; Max Koehler; Henry Koehler, Jr., Lee Benoist and A. W. Lambert, of St. Louis; Ed. L. Barber,



Fig. 1. Main Exchange, Kansas City Home Telephone Company.

of Wauseon, Ohio; James S. Brailey, Jr., of Toledo, Ohio, and Arnold Kalman, of St. Paul, Minn.

The company is operating under a thirty year franchise in Kansas City, Mo., and a twenty year franchise in Kansas City, Kan. The rates fixed by ordinance in Kansas City, Mo., are \$54 per year for business telephones and \$36 for residence telephones, with the privilege of increasing the rate on business telephones after January 1, 1907, to \$60 per year. In Kansas City, Kan., the business rates are \$54 and the residence rates \$48 per



Fig. 2. Operating Room, South Branch Exchange.

year, within a radius of $2\frac{1}{2}$ miles from the business district, and the company is entitled to charge an additional \$6 per mile per instrument for each additional mile or fraction thereof, for extensions beyond that radius. The company has, however, adopted a uniform rate in both cities, of \$54 per year for business telephones, and \$36 per year for residence telephones, furnishing an unlimited service between the cities.

The construction company began the actual work in the fall of 1902. Multiple-duct conduits were laid throughout the entire business section, the company now having 750,000 duct-feet of conduit and 260 manholes. All-copper overhead construction has been adopted throughout the residence districts, and local distributing poles are located in the alleys throughout the city. To distribute the load on the system to best advantage, it was decided to build one main and three branch exchanges.

The main building, which is located on Baltimore avenue, between Tenth and Eleventh streets, in the business center of the city, is a handsome three-story and basement brick building, with terra cotta trimmings. It is 120 feet in length, and has a frontage of 60 feet, while the width in the rear is about 44 feet; eight feet having been cut off on each side, to provide ample light and air, in case buildings were built up closely on each side.

The 37 lead-covered cables, each containing 200 pairs of No. 19 gauge Roebling dry-core paper-covered wires, come into the building in the basement, and are there spliced to twice the number of 100-pair cables, which run to the distributing frame above. A repair and carpenter shop is also located here, with lockers and toilets for the outside men, hot water and steam combination boiler, and the material room.

On the first floor of the building is located the business office, the offices of the engineering department, and of the general manager, and also rooms for the board of directors. These offices are all finished in elegant style, with mahogany furniture and fittings.

The second floor is occupied by the power apparatus distributing frames, wire chief's office and the long distance switchboard. A duplicate set of motor-generators of the Holtzer-Cabot type, for charging purposes, is provided. The motor receives 114 amperes at 220 volts, operating at a speed of 1,000 r. p. m. and the dynamo generates 300 amperes, at 60 volts. As there is a duplicate set of batteries, the charging machines are so connected that either set of batteries may be charged by either machine, and the ma-

chines are so wound that the batteries may be charged while furnishing current for the exchange without creating noise in any of the talking circuits.

The ringing machines, which are made by Roth Bros. & Co., are equipped with the "busy back" signal for the trunking positions, and a "howler" signal for subscribers who may leave the receiver off the hook. The generators each have sufficient output to operate the entire capacity of the switchboard.

The power switchboard is made of Tennessee marble, is 12 feet long and 8 feet high, and consists of four panels, the fuse panel, ringing panel and two lower panels. The power panels are provided with Weston voltmeters and ammeters, switches for connecting either machine to the battery or for charging the battery whilst it is feeding current to the switchboard, and automatic circuit breakers preventing the current from flowing back from the battery. The voltage of each individual cell may be read on a special low-reading voltmeter. All circuits leading from the board are fused on this board. The main distributing rack is built of structural iron, and so braced as to be rigid and substantial. They are provided with terminal tips mounted on hard rubber, and arranged at present for 5,500 lines, but so designed that additions can be made from time to time until the full capacity of the exchange is reached.

The intermediate distributing rack is similar in construction to the main rack and is so arranged that any line may be connected to any operator's position without changing the number of the outside line, or the multiple jack. Next to this rack comes the relay frame, on which the line relays are mounted. Sufficient room has been left between these racks and the power plant so that they can be extended to a capacity of 12,000 subscribers.

A duplicate set of batteries is located in a room in the rear of the power switchboard, and these batteries furnish all the current required for the operation of the exchange without being charged oftener than once in 48 hours. Each set of batteries consists of 20 cells and the plates in each cell are placed in lead-lined tanks of such size that additional plates can be added until there are a sufficient number to operate the exchange, at full capacity, for 36 hours without recharging.

Close to the power plant is the wire chief's desk. It is arranged for two positions, and each position is equipped with ten complete cord circuits with listening and ringing keys and ten order wire keys. Space is provided in each position for a future capacity of forty line lamps and

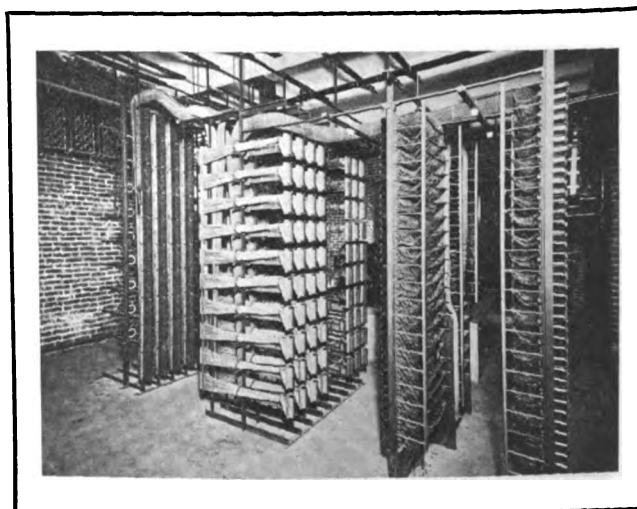


Fig. 3. Distributing Frames and Relay Rack, East Branch Exchange.

jacks, the present equipment being for thirty lines. Besides these lines there is one to the chief operator's and monitor's desk, one to the trouble clerk, and six to a strip of multiple jacks in the main board. Five jacks terminate in cords and plugs in the keyboard, at the eleventh and twelfth positions, two in cords and plugs in one of the trunking positions in branch exchange A, two in B, and two in C. There are also five two-way leads to the distributing frames of the different exchanges. All lines being duplicated in the two positions, so all tests can be made from

either positions, double scale voltmeter, of the Weston pattern, is situated between the two positions. All circuits are so arranged that by manipulating keys all the required tests for grounds, opens, reverses, shorts and all other trouble, both on the line and on the switchboard, can be made from this desk. There is also a key and special apparatus for signaling a subscriber when his receiver is left off the hook.

The long-distance switchboard is located on this floor, and at present has a 30-line equipment. It is designed for four positions. The board is equipped with standard calculagraphs for the timing and checking of messages, and is provided with the modern incoming and outgoing trunking facilities for the rapid handling of the service.

On the second floor, but separated from the mechanical department by the main hall, is located the dining-room and kitchen for the benefit of the operators; and also the office of the superintendent of equipment.

The main operating room is situated on the top floor of the building, and every effort has been made to make this room perfect, from both the mechanical and operating point of view. Plenty of light is assured by both a large number of windows and skylights, while a 30-inch ventilating fan, pulling the vitiated air out at the floor line insures a good circulation of pure air.

The switchboard consists of 19 sections, of 3 operators' positions each. It has a present equipment of 5,500 lines, with 16 outgoing trunk lines and 20 desk trunks, and 150 incoming trunk lines and 16 desk trunks. The ultimate capacity provided for is 12,000 lines, 360 outgoing trunks and 20 desk lines in each section, and 140 answering jacks and lamps in each position. Each of the local, trunk and desk lines is multiplied throughout every section, and each position is equipped with 15 cord circuits with listening and ringing keys, supervisory and pilot lamps and a bank of ten order keys.

The frame work of the board is built of structural iron, and the exposed cabinet work, including all the cable boxing in the exchange room, is made of selected mahogany, while the rear of the board is enclosed with hardwood doors, which are readily removable. The position of each operator is provided with two pilot lamps, with jeweled caps, mounted directly behind the cords and plugs, and just below the answering jacks. One lamp being provided with a white jewel, and operates in circuit with the line lamp relay, and remains lighted until a call is answered, while the other lamp is provided with a red jewel, and operates in circuit with the answering supervisory reply, and remains lighted until the connection is taken down after the subscriber who originated the call has restored his receiver to the hook.

All supervisory and line relays are capable of being operated through 1,200 ohms line resistance, and can withstand twice the normal pressure of the battery without sticking. All the circuits are metallic and are perfectly balanced under all operating conditions. In the center of the main operating room, which is 40x90 feet, and in full view of the entire board, are the desks of the chief operator and trouble and information clerks.

The operators are in charge of Mrs. H. Brown, a well-known authority on the training of telephone operators.

To one side of the operating room, and in the front of the building, is an emergency hospital, equipped with modern medical

appliances for the temporary treatment of operators who may be taken suddenly ill.

On the opposite side is the operators' rest room, which is furnished in a comfortable manner, and is greatly appreciated by the operators, who here put in their two rest periods, of a half-hour each every day.

The three branch exchanges are almost identical in construction and equipment.

Branch A is known as the East office, and is located in the eastern residence district of the city. The switchboard consists of seven sections, of three operators' positions each, and is at present equipped with 1,200 lines, with 100 outgoing banks and 20 desk trunks, and 100 incoming trunks and 12 desk trunks. Provision has been made for an ultimate capacity of 7,200 main lines.

Branch B, known as the South office, is in the southern residence part of Kansas City, Mo., and is equipped with a switchboard of five sections of three operators' positions each, and the present equipment consists of 700 lines, with 80 outgoing trunk and 20 desk trunks, and 75 incoming trunks and 9 desk trunks.

Branch C, known as the West office, is located in Kansas City, Kans., and is at the present time equipped with 800 lines, with 60 outgoing trunks and 20 desk lines, and 75 incoming trunk lines and 9 desk trunks.

The plants were all built by the Central Telephone Construction Company, under the supervision of W. C. Polk, the chief engineer of the Construction company, and the equipment was furnished by the Stromberg-Carlson Telephone Manufacturing Company, of Chicago and Rochester.

There has been another company formed to handle the toll line business, known as the Western Independent Telephone Company, which has an authorized capital stock of \$1,500,000, and the following list of officers: E. L. Barber, president; J. J. Heim, vice-president; O. C. Snider, secretary and treasurer.

This is destined to be a very important adjunct to the Kansas City exchange, for the surrounding country is full of Independent telephones, it having been estimated that there are five Independent telephones to

one Bell telephone in Kansas and Missouri, and the lines to Topeka, Kans., are in operation and give service to a great many Kansas points.

There are also under construction, and soon to be completed, lines reaching Leavenworth and Atchison, Kans., and St. Joseph, Mo., to the north, and a line to Lexington and Sedalia, Mo., to the east. At the terminals of these lines connections will be made with other Independent lines, reaching over Missouri, Iowa, Illinois, Kentucky, Indiana, Indian Territory and Northern Texas.

THE LAW AIDED BY TELEPHONE.

A CASE where the arm of the law was lengthened by the use of the telephone happened in Cleveland last week. A little girl was crossing one of the crowded streets when she was run down by a careless driver. Firemen at an engine house near which the accident happened tried to catch the fellow, but he drove rapidly away. One of the firemen hurried to a telephone and called up a police station toward which the man was driving. He gave a description of the man and told the police to be on the look-out. In a few moments the fellow was under arrest.

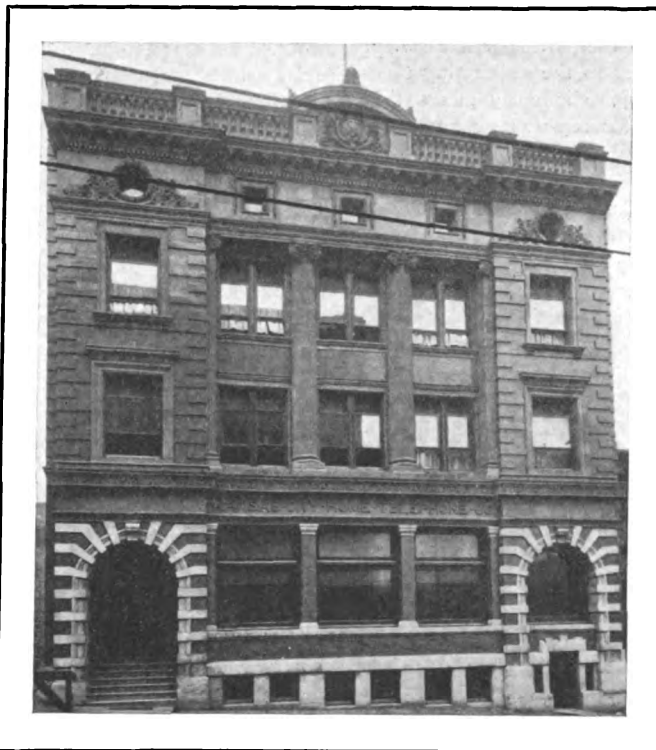


Fig. 4. Main Exchange Building.

PM

General note

TECHNICAL TRAINING

SINCE the Spanish War the phrase "the man behind the gun" has become a trite aphorism. There is but little excuse for the horrors which warfare inflicts, but, nevertheless, some good lessons may be learned from even so dreadful an experience. At the beginning of the conflict even optimistic Americans felt that the outcome of a naval battle might be at least somewhat doubtful, as the reports of the strength and efficiency of the Spanish navy had been circulated far and wide. But the entire campaign was a perpetual series of demonstrations showing that organization and training were always sufficient to turn the scale of victory, even in the face of a larger and possibly better equipped force. The opinions of the thinkers of modern times forcibly emphasize the essentiality of such an education and training as shall so specialize each man for his selected vocation as to enable him to do some *one thing* better than any one else can do it. The broadest and widest educators of the day are laying stress on this principle, and are pointing out that the road to success lies first through the most thorough and systematic education whereby each one shall prepare himself by a long course of highly specialized training for the particular line selected. Mr. Charles F. Scott, in an address to the graduating class of the Stevens Institute of Technology, felicitously places this subject before his audience, and from his remarks we quote the following as appropriate and suited to our readers:

"It would be interesting to consider in detail the specific ways in which the development of different phases of engineering work have been effective in accomplishing useful ends. It is of interest also to generalize in order to determine the particular process, if such we may call it, by which engineering promotes progress. Consider first the methods by which the newest branch of engineering has become so effective. The result of the application of electricity may be summarized by saying: Electricity increases efficiency. The electric motor, for example, does little which may not be done by other means—it propels cars, it operates cranes, it drives machine tools and printing presses more conveniently or rapidly or cheaply—in short, more effectively than other agents. By reducing time and cost and increasing output it increases efficiency. In the same manner the great result of engineering is this: Engineering increases efficiency. It provides the instruments and the means and the methods by which the results of human activity are enormously increased. It increases the work a man can do; it increases the wealth a nation can produce; it increases comfort and well-being; it gives larger and broader life. The building of a new bridge, or of a larger or more efficient engine, or of a more convenient office building, are not merely individual things to contribute to the convenience of a few persons; still less are they to be considered as the means by which the engineer or the builder may derive remuneration. They are part and parcel of the great mechanism, of the intricate machinery of our modern life, and they are as essential to its existence and its prosperity as are the buildings and power plant and tools in a great machine shop to the workmen who are making locomotives. Consider it in this light, young men, and the profession you have chosen is one whose calling is high and whose responsibilities are large. Do not lose sight of this broader view; do not become so absorbed in minutia or in details that you miss the inspiration which comes from realizing the part which your profession and your work is to fulfil in promoting onward progress, for we are now 'in the throes of yet greater things.'

"You are going forth to take up your part in the world's work at a time when the work of the engineer *per se* has attained new magnitude, new importance and a higher rate of advancement. It is at a time also when social and industrial affairs are in the midst of great changes, and at a time when the work of the engineer is most fundamentally and intimately related to those great movements. The very conditions which underlie modern life, such as railroads, steamships, manufactories, power transmission, the construction of modern cities with concentrated, in-

tensive social and business activity—all these come from the engineer. Modern co-operation—social, industrial, commercial, financial—are all the outcome, the results of the conditions which have been forming and crystalizing as the results of engineering work. Hence, the wider range, the greater responsibilities, the larger life of the present and the coming engineer."

One of the important phases of the new order of things is the aggregation and the combination of industries and of capital which characterizes every branch of business. It has been asserted that this is subversive of individual independence, that it restricts individual aspiration and advancement, and that it is a dark cloud on the horizon of the college graduate.

"I have seen recently an extract from an address by Mr. James B. Dill at the University of Minnesota, which deals with this question. He said: 'I believe that the tendency to organization, to combination, has put a demand on the college-trained minds, has put a premium upon the services of such men, and has made it easier than formerly for the college graduate to get started and to succeed in the world. When the first movement shall have steadied itself, and when it shall have eradicated those tendencies which are, apparently, in the wrong direction; when it shall have increased and strengthened those elements which are right, then the men in charge of the great combinations and in executive positions will be the men who not only have a knowledge of business, but those whose minds have been broadly trained and whose characters have been formed within university halls. The situation demands the employment of college men.'"

Such sentiments as these which I have quoted put a new meaning into the movement toward organization and combination. These general questions are not separate and apart from the field of the engineer. They are vitally connected with his work and his interests. He who has paved the way by the development of material things for combination and commercial and industrial affairs, which in turn have led to new social problems, has assumed new relationships and new responsibilities. He has furnished the machinery and the material appliances and facilities on which the great interests of the present are based. May not the methods and the principles and ideals which have proved successful in dealing with material things be applied also to those organizations which deal with men? Has not this material basis of modern life been more successfully and skilfully and completely established than its financial and political and social relations? It is unjust distribution of wealth and speculation, it is corruption in municipal and general government, it is conflict between laborer and employer that disturb and threaten. The engineer is in contact with facts; he has learned the value of Truth. He knows and respects physical laws. Effects follow causes quickly; failure is the certain consequence of false data or bad methods. But human affairs are more complex; failure cannot so readily be traced to its cause; the Truth is not so evident, nor is it so respected, yet after a long time it is just as surely final. The ideal underlying engineering work is efficiency—the production of the maximum result with the minimum of effort. The prevailing motive elsewhere is selfishness. Trace them back to their ultimate causes and you will find that the real danger in business is that which comes from greed, and the real cause which underlies the conflict between labor and capital is selfishness. The aim of the old-time military engineer was destruction; the object of the modern engineer is construction. Engineering became a new factor in world history when it severed itself from warfare. Who can figure the transformation when the principle of war and selfishness in business and in social affairs shall be supplanted by higher and nobler and better motives? Then we shall find that the Golden Rule—the law of Love and the law of Efficiency—are one and the same.

Almost simultaneously Mr. George A. Damon, in a paper before the Western Society of Engineers, presented some valuable statistics, showing the commercial results which are attained by the trained man. Mr. Damon's investigations were confined chiefly

to the electrical industries, although the results may probably be taken as fairly applicable to any of the scientific professions. The problem which Mr. Damon set himself to solve was to determine whether a collegiate or so-called practical training best fitted a man for his life's work. The following quotations from Mr. Damon's results are germane to the question:

"Knowing that the leading electrical men of Chicago would afford a valuable field for studying results, and would welcome an opportunity to help furnish a solution for the problems of the boy, a letter of inquiry was sent to 100 of the leading men in Chicago engaged in the various branches of the electrical industry. An opportunity was given at the same time for the expression of opinion on various questions pertinent to the general subject. The response to the circular letter was hearty and spontaneous, and we are under obligations to 100 of our friends who have so kindly consented to become living examples, and who are willing to be analyzed for the good of the cause. The following is an analysis of results: Young men control the business. The inquiry was, therefore, confined to men between the ages of 27 and 45, upon the theory that the older men are the product of a set of conditions which have passed away, while the youngest men are, as a rule, still engaged in a period of preparation. The average age is 33½ years.

"The average income at each age shows an earning of \$2,170 at 27, and this increases to \$4,000 at the age of 38. The average income of the entire 100 men is \$3,440 per year, which will give us a standard by which we can measure the different branches from a mercenary standpoint.

"The 100 men may be divided into groups as follows:

	No. of Men.	Average Age.	Average Income.
Salesmen	7	33	\$2,400
Sales Managers.....	11	36	3,400
Business men.....	10	36	4,800
Sales engineers.....	8	35	2,350
Electrical Engineers.....	16	33	2,800
Constructing engineers	6	33	2,850
Electrical experts.....	8	33	3,200
Operating engineers.....	3	32	2,250
Operating managers and superintendents	10	34	3,550
Professors and editors.....	8	34	2,500
Patent attorneys.....	4	32	4,000
Consulting engineers.....	9	40	6,400

"Total number of men, 100. General average: Age, 33½ years; income, \$3,440.

"Classified in reference to incomes, the record is as follows:

	No. of Men.
Income over \$10,000 per year.....	5
Income between \$5,000 and \$10,000.....	9
Income between \$2,400 and \$5,000.....	66
Income below \$2,400	20
Total.....	100

"It should be stated that there are in Chicago at least 100 more men in the business whose incomes average about the same as the first 100 selected. An effort was made to make the list representative, and the men were selected on account of their positions without reference to their incomes. It is to be understood that the dollar is not the most desirable standard by which to measure men individually; but looked upon as a class, a study of the averages furnished by the inquiry is interesting and may be made instructive. Salesmen who have technical ability or possess engineering information, as a rule get better salaries than those who do not. Add initiative and executive ability to the salesman's qualifications, and he becomes a sales manager, with a still greater reward. Enterprise and energy put the man in possession of his own business, or often result in a partnership arrangement. A technical man without the commercial instinct is only fairly well paid. Ability to develop new methods or apparatus

puts him in the expert class, where the rewards are greater and in proportion to his ability.

"Routine work, such as operating, is the least remunerative work of all. Operating managers and superintendents, however, are very well paid. The phenomenal development along all electrical lines, and particularly in the telephone business, makes the profession of patent attorney a paying one for those who are qualified for that kind of work. The field of consulting electrical engineering looks attractive, but it will be noted that the average age is greater in this branch than in the others, which means that the successful consulting engineer brings to his work years of experience, and that it is therefore not a branch to be adopted at once by the young man.

"Forty per cent. of the men in the list are employed by what might be termed the 'large' companies. Thirty-five per cent. of the men either control the business in which they are engaged or own a partnership interest. Twenty per cent. of this 100 successful men never had any college education whatever. The average age of the 20 men who are succeeding without a college education is 36 years, and their success, measured by a monetary standard, shows an income of \$3,670 per year.

"It will be noted that the 20 men without the education are getting along financially slightly better than the general average of \$3,440 per year. This is explained by the fact that in their number are included several men who are prospering as a result of their business enterprise. There are few non-technical men engaged in the strictly technical end of the business who reach the average income. There seems to be more openings for the man without a college training in the telephone field than in any other.

"Each of the 100 men included in the inquiry was asked to name the three fields which he considered most promising within the immediate future, and the votes received were as follows:

Electric railway work.....	63
Telephony	36
Transmission	30
Electro-chemistry	29
Power applications.....	21
Lighting developments	12
Manufacturing	11
Central station work.....	9
Patent law.....	6
Consulting engineering.....	6
Contracting	5
Management of properties.....	5
Storage batteries.....	4
Reconstruction of plants.....	3
Mining	3
Metallurgy	3
Turbines	2
Wireless telegraphy, designing, high-speed telegraphy, underground conduit construction, isolated plants, train lighting and municipal lighting, each.....	1

"Practical experience is as essential as theoretical training. Too little attention has been paid by students in getting into thorough contact with the way things are actually done. This is the result of the general practice of allowing the young man to shift for himself.

"'I can't get a job without experience,' he says, 'and I can't get experience without a job;' and then, more or less discouraged at the outlook, he takes the first opening which presents itself, and it may or may not be the kind of work for which he is fitted. What is needed is a general clearing-house of information, a closer union between the ambitious student and the successful men who have been pioneers in the work."

INCREASE GREATER THAN EXPECTED.

THE operators of the Cuyahoga Telephone Company in Cleveland are more glad at their May day increase than was at first announced, for the increase granted them was 25 per cent. instead of 8 per cent. The erroneous statement was made at company's headquarters in the hurry of getting the new pay-roll adjusted.

IMPROVEMENT IN MAGNETO SWITCHBOARD SIGNALLING

BY J. W. LATTIG and CHARLES L. GOODRUM.

EXPERIENCE in securing disconnection and second connection on magneto switchboards where both series and bridging equipment is in use has been the cause of much annoyance and complaint. The first connection can usually be obtained promptly, but it is frequently found to be very difficult to signal central for a disconnection. This trouble is usually due to the failure of the ring off drop to operate, the drop being bridged across the cord circuit, as per Fig. 1, in which *C* is the cord circuit terminating in plugs *P*. *D* is the drop bridged across the two conductors, as shown.

The average magneto exchange is equipped with a mixture of series and bridging instruments, while the ring-off drops are usually of bridging form. In fact, in this description we shall consider only that form.

Now assuming that two lines have been connected by cord circuit *C*, Fig. 2, in which *D* is the ring-off drop of 1000 ohms, and

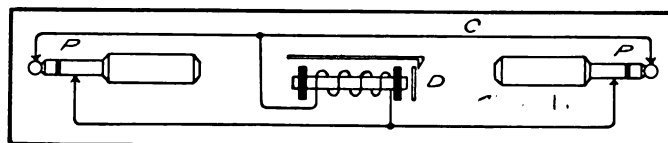


Fig. 1.

that telephone *A* is of the bridging type with 1,000-ohm ringing coils *E*, while telephone *B* is of the series type with ringing coils *F* of 80 ohms. When the conversation is finished the subscriber *A* endeavors to ring off by turning his generator crank in the usual manner. He then again signals central, only to find that he has not been disconnected from subscriber *B*, who answers a second time, when both conclude that central has been neglectful

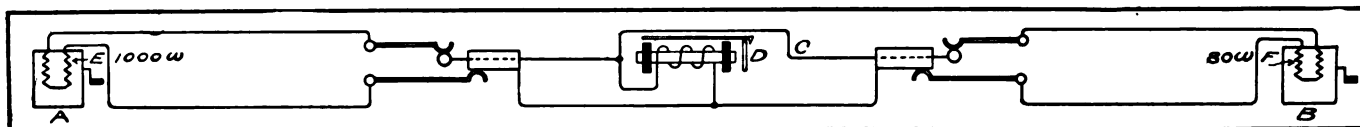


Fig. 2.

of her duty, and the company is in their minds indifferent to the class of service given by its operators.

In reality the trouble is due to the fact that the ring-off drop has failed in consequence of electrical conditions existing, which are as follows: The current from generator at telephone *A* instead of passing through the ring-off drop *C* of 1,000 ohms, is largely shunted by the ringing coils *F* of telephone *B*, which are only 80 ohms, leaving such a small proportion to pass through the ring-off drop *C* that it is insufficient to operate it. If both telephones *A* and *B* happen to be series instruments the same difficulty in ringing off will be experienced at each telephone.

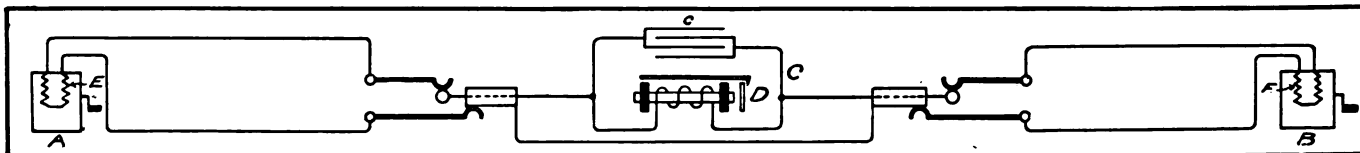


Fig. 3.

Under these conditions the only chance the subscribers have of securing a disconnection is by the constant supervision of the operator listening in and saying in that familiar tone, "Waiting," "Waiting," "All through," etc.

Having ourselves found this condition existing, and having experienced the complaints of subscribers in a number of exchanges, we set about devising a remedy. There are two quite simple methods to correct this fault, which may be applied at

central. Fig. 3 represents the first method. It consists of the usual 1,000-ohm drop *D*, which in this case is connected to both tip ends of the cord circuit *C*, and is bridged by condenser *c*, as shown.

Assume again that two subscribers, *A* and *B*, are connected together through the cord circuit just described in Fig. 3, which is applied in Fig. 4, it will be noticed that the cord circuit, drop and condenser *c* are arranged as in Fig. 3, but in this instance, whenever either subscriber *A* or *B* endeavors to ring off, the current from the generator will divide between the ring-off drop *D* and condenser *c*. The frequency of the current from the generators is so low that the condenser *c*, usually of 2 M.F. capacity, offers a high resistance to such current, causing the greater portion to pass through the drop *D* operating it. It must be noted that the condenser *c* offers very little resistance (*impedance*) to the usual

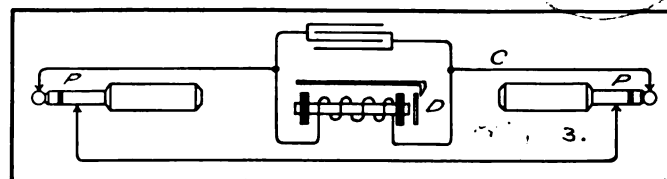


Fig. 4.

talking currents, which are of extremely high frequency. With this plan it is apparent that the telephones *A* and *B* may be bridging and series, or both bridging or both series.

While this method is good and works very satisfactorily in practice, we consider a second method superior, and while we are using both we have adopted the latter because it is more convenient, economical, and has in addition the advantage of having

the ring-off drop bridged, as shown in Fig. 5. In this figure we have introduced into the cord circuit *C* two non-inductive coils, *N*, *N*, of 500 ohms resistance each. One of these coils is between the tip and tip of the cord circuit, and the other between the sleeve and sleeve, with the ring-off drop *D* connected at the center points of *N* and *N*, as shown.

We shall now assume that *A* and *B* are connected, as in 6. When the ring off takes place the current from station *A*, for example, passes to the center point of non-inductive coils *N* and *N*, whence it finds two paths, one through the ring-off drop *D* and the other through telephone *B* via the other halves of coils

N and *N*. Since the two halves of these coils equal 500 ohms resistance, it is immaterial as to what the resistance of telephone *B* is; hence, as in the other case the telephones may be alike or different. Should the disconnecting current originate at telephone *B* the operation would be reversed, obtaining the same results.

Cords so equipped should not be used for connection from "toll to toll," as it increases their static capacity. No harm results from their use for "local to toll."

SOME SIDE LIGHTS OF THE EVANSVILLE SITUATION

THE following facts concerning the fight for a franchise by the Citizens' Telephone Company (organized and owned by citizens) in the city of Evansville were secured in an interview with Mr. L. E. Ebersole, engineer of the Evansville Telephone Company, which is succeeded by the Citizens' Telephone Company.

The Bell company has always said that the city was getting all the trade of the surrounding country, and that an Independent company could not help matters in any way. The Bell company had solicitors in the surrounding towns asking the citizens to sign a petition to the Business Men's Association and Council of Evansville, not to grant a franchise to an Independent company,

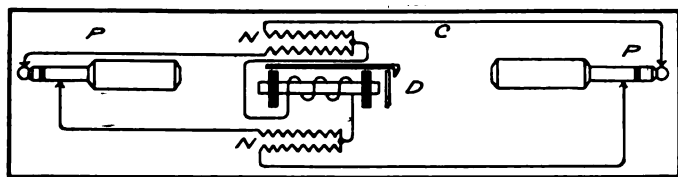


Fig. 5.

as it would naturally take trade from the local merchants and send the same to this city. So far they have met with little or no success in that scheme. Then they adopted another plan that they hoped to work to good advantage: Having the papers, where they can use their columns as they see fit, they have sent reporters from the local papers to the towns near here where there are two systems in use, with instructions to secure interviews with the merchants who are opposed to two systems, and while a man may be opposed to the Bell company, when he is approached on the matter that part is left out and the fact that he was opposed to a dual system paraded before the public, and made to appear that every one interviewed is in favor of the Bell company, when the facts were just the opposite.

In the face of all the efforts to keep out the local company the Cumberland company are trying to raise their rates at the

and that it will also help the cause of the Independents in Kentucky and Tennessee.

INDEPENDENT TELEPHONY IN VIRGINIA.

By J. A. HELVIN.

THE underhand methods of the Bell Company to gain control of the telephone field in the Southern States is interesting. In 1895, the Bell Company had in the State of Virginia exchanges at Richmond, Petersburg, Norfolk, Portsmouth, Newport News, Danville, Lynchburg, and Roanoke, with upwards of 3,000 telephones, giving local service entirely. The revenue from this system, except that used for running expenses, was sent out of the State.

About this time the Independent telephone movement was beginning to sprout. The Bell Company cast around for some means to check this growth. A Mr. Curtis, of New York City, a Bell tool, was sent South and interested one of the leading men associated with the Staunton Long Distance Company to negotiate a sale of its toll lines to the Bell. This being successful, a Kellogg board was installed with a Kellogg man in charge and a Bell general manager. The Kellogg man looked after the system, the Bell man attended to the aldermen. In a short while the plant at Richmond was sold to the Bell interests under the idea that the people had to have long distance service, which the Richmond Company was not able to furnish. It is interesting to note here that not over 15 per cent. of the people use long distance lines. The sale of the Richmond plant carried with it the Bell ruse of renting its transmitters, "as it would be impossible to use others in conversation over long distance lines." After this brilliant coup, the Bell manager left Richmond for Atlanta, and the other fellow remained to work the renting scheme of switchboard free and telephones at 50 cents per month, with contracts for five years if possible. The Bell people were to buy the Independent telephones at \$6.00 each, to be taken out in service; thus the money to go back to Boston, at the end of five years,

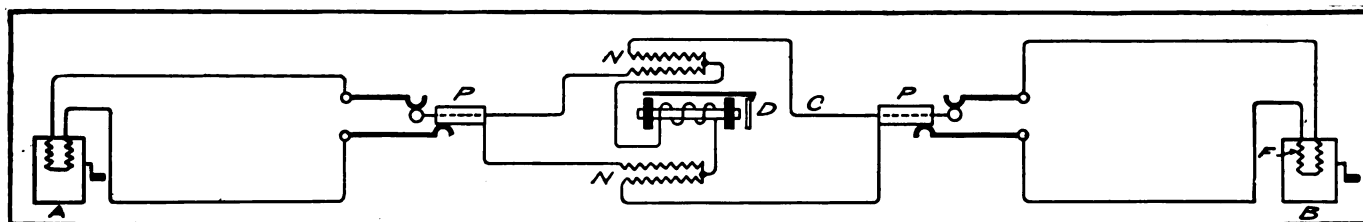


Fig. 6.

present time. They have installed a central energy system, and have taken out all Blake transmitters in the residences, replacing them with a cheap telephone, the same as is used for private branch exchange work, but in business houses they allow the Blake to remain, and when any one complains of the service they tell them that they will give them a long-distance instrument for 50 cents additional per month, making the rate \$5.50. They will not place any more telephones at \$1, but now ask \$1.50 for residence party line connections. The intention is that as soon as all the Blake sets are out of the way to spring the standard instrument for exchange purposes, and then ask 50 cents per month more so that the people will have made the increase themselves. It has been hinted that if the Cumberland company could have delayed the granting of this franchise until next spring they would have come to the city and elected a council that would protect their rights.

One of the employees of the Cumberland company has admitted that if the Independents get a foothold in Evansville that the Cumberland will be badly hurt, and that the chances are that they will lose out in all the places they operate in this State,

would buy the Independent interests in the exchange. The Bell had the telephones and switchboards; the Independents had the poles and wire; and the people paid the bill. About this time in Petersburg, Newport News, and strange to say, Staunton, where the scheme of fraud was started, the long-suffering public became aroused to the necessity of action. An investigation committee was appointed to learn about Richmond and the manager admitted that money in bulk was laid out to decorate the aldermen's desks. The Richmond papers gave to the community the amount laid down by the Bell and picked up by someone interested in revenue only.

In manner similar to this the Bell Company has held control of the Southern telephone situation, but the Independents are beginning to take a new issue of life. New companies are being organized, and ere long the State of Virginia will have profited by past experience and be able to hold its own as an Independent field. Practical management of up-to-date apparatus is what is wanted in the South, and to capitalists who are interested in the Independent telephone movement the opportunity should be as lucrative as any in the country.



INDEPENDENT SECURITIES STRENGTHENED.

IT is interesting to note that already the decision of the Tennessee court against the Cumberland Telephone and Telegraph Company, recently referred to by *THE AMERICAN TELEPHONE JOURNAL*, is bearing fruit. Independent telephone securities have been strengthened in the market. This is only one of many causes which have been operating to completely change the attitude of the commercial public toward Independent investments. Whereas such securities were once looked upon askance by those who regarded the Bell Companies as invincible and Independent telephony as, at the best, an experiment, they are now sought after and are regarded as both safe and profitable.

The Western Union decision, involving a loss of millions, the Kellogg Switchboard and Supply Company matter and other expensive and disastrous litigation; the Michigan foreclosure, the discredited securities of the Central Union Company, the enormous and increasing indebtedness of the American Telephone and Telegraph Company; all these things and others of a similar nature have served not only to throw suspicion on Bell methods and Bell investments, but to open the eyes of capitalists to the remarkable success achieved by Independent telephone companies wherever they have entered the field and to the possibilities along the line of investment and exploitation in Independent telephony.

In the nature of things this will become more and more the case as the eyes of the public become further opened to the actual condition of affairs. Following close on the heels of the now famous Cumberland decision will be others. There are a number of cases pending in the courts which have grown out of the underhand methods of the Bell people, who have not dared let their claims for public favor rest upon service and enterprise.

The people are not the only ones who have seen a great light since the enormous development of Independent telephony. The American Bell Telephone and Telegraph Company has learned a few things from experience and, now that the horse has been stolen, is striving with commendable zeal to lock the barn door. It is amusing to those on the inside to watch the methods now taken to extend the Bell subsidiary systems in towns which were formerly denied telephone facilities.

In the State of Ohio, for instance, the Central Union Company is trying to compel the people to accept its service and permit its lines to be constructed. The Central Union has actually made application in the probate courts of a number of counties for franchises. The case at Van Wert, Ohio, is typical. The Central Union tried to secure a foothold in that city to operate an exchange, but was not wanted for reasons which seemed good and sufficient to the city council. Then the company applied to the probate court, declaring that it had exhausted all means to secure a franchise through the council. The city's attorneys filed a demurrer stating that the plaintiff was not entitled to the relief asked for, because it was a foreign corporation, and Judge Sweet, in a comprehensive opinion sustained the demurrer. Surely times have changed and the telephone business is not what it used to be.

As a matter of fact, the people are growing distrustful of Bell people and Bell methods, as they certainly have reason to be.

BY THE CUMBERLAND TELEPHONE DECISION.

Local companies have no fear of reasonable and legitimate competition. Let a monopoly and an Independent company meet on a fair field on equal terms and the outcome need not be feared.

But there are many clubs which a monopoly, grown fat through years of extortion, can swing to drive local companies from the field, and swing very effectively unless the Independent company has great faith and a long purse.

This growing distrust of Bell methods was never more clearly shown than during this present month at Luray, Virginia. A few years ago this great monopoly would have scorned the suggestion that Luray ought to be given telephone facilities. The town of Luray and the county have local telephone companies and excellent service, but the Bell concern has no foothold there. Several unsuccessful attempts have been made to secure a franchise from Luray to erect telephone poles in the streets of the city. Supposing it would have no difficulty in securing this franchise, the company proceeded to distribute its poles almost the entire distance from Front Royal to Luray. But the franchise was not forthcoming and a large force of men had to be put to work by the disgusted company to remove its poles from the county.

The significant fact about this incident is the reason given by the Luray council for refusing the franchise. It was not the prospect of competition and a double telephone system which deterred the aldermen from granting the prayer of the petitioners, but the fear that the Bell concern would, in some way, drive the local companies from the field and so stifle competition.

How could this be accomplished when in the end a telephone company must stand or fall with the character of its service? This question has been answered most emphatically in Bangor, Me., where the Bangor Automatic Telephone Company is seeking a franchise. This territory is served by the New England Telephone and Telegraph Company, a Bell concern. As soon as the Independent company asked for a franchise, the company offered a three months' service free. If, at the end of three months the parties, for any reason, do not care to continue the service, the instrument is taken out. There is no expense for the three months' service, whether the subscriber becomes permanent or not.

This looks like a good proposition on its face and many Bangor people are taking advantage of it. The company has used the same policy in other places where it wished to discourage competition. Nor is this the first time this method of driving out a proposed competitor has been resorted to in Bangor. The people there evidently have not the moral backbone of those patriots up in Wisconsin, whose action has already been commended by *THE AMERICAN TELEPHONE JOURNAL*. The Bell company there made a similar proposition. But, so great was their distrust of Bell methods and so great was their faith in the belief that they would have to pay for it in the long run, the people absolutely refused to take advantage of the offer of free service.

However, notwithstanding such time-worn methods of hoodwinking the people and discouraging competition, Independent telephone companies seem able to take care of themselves, and the enormous and significant expansion of Independent telephony continues without abatement.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

DUTY TO FURNISH SERVICE.

SOME time ago a subscriber refused to pay his bill for the three months he had used our telephone, on the ground that we had failed to furnish him with a directory. We took his telephone out. Now he asks to have it put back again. Are we not right in demanding that he first pay what is due us? He threatens a mandamus unless we replace his telephone. He is a lawyer.

HE can legally ask you to replace the telephone and may compel you to do so by mandamus. The unsettled account is at most a debt against him, for which you have a right of action and may bring suit. *State v. Nebraska Telephone Co.*, 22 N. W. 237.

GRANT APPLIES TO ANNEXED TERRITORY.

IN an opinion given by Judge Mack in the circuit court at Chicago the Chicago Telephone Company was dealt a severe blow in its contention that the terms of its original grant do not apply to the territory annexed since 1889. The decision was in the case of the Alton Grain Company and twenty others, who ask an injunction to restrain the company from charging more than \$150 a year for unlimited service in the district lying not more than a mile outside the original limits of the city.

Judge Mack's opinion was given in overruling the company's plea that the ordinance sued under does not apply in the disputed district. Said the court, "It seems to me that on a grant of this kind there can be no doubt that the intent is that whatever may fall within the city of Chicago within twenty years is included within the terms of the grant so far as permitting the telephone company to occupy the streets."

The result of this suit will be cheapening telephone service for thousands of people. It means the company must pay 3 per cent. of its gross receipts outside the original territory of the grant given by the ordinance of 1889. It will amount to at least \$170,000 a year added to the city's coffers. The opinion backs up Judge Tuley's opinion on the original grant, but goes much farther, including the principle that the terms of the grant follow the extension of the city limits.

MUNICIPAL REGULATION OF RATES.

THE Supreme Court of Maryland has rendered an important decision in the case of Charles Simon's Sons Company vs. the Maryland Telephone and Telegraph Company of Baltimore City. The suit was for an injunction to restrain the company from charging higher rates for its telephone service than was authorized by the city ordinance granting the company permission to construct and maintain its lines in the city. The rates provided for in the ordinance were not more than \$4 per month for telephones furnished to business offices, and not more than \$3 per month for telephones furnished to dwelling houses within the city. The company accepted the ordinance and commenced business under its provisions. The complainants, all of whom have business establishments in the city, sued for themselves and all others in like situation with themselves, as respects the use of the telephone. They alleged that prior to 1903 they had contracts for telephone service with the defendant at the rate named in the ordinance, under which telephone apparatus known as the "metallic circuit" had been established in other business houses. The company refused to furnish the complainants the telephone service mentioned at the rate specified in the ordinance, and, it was alleged, threatened the discontinuance of the service and to remove its telephones unless they agreed to pay at the rate of \$72 per annum. The company demurred to the bill of complaint on the ground that no contract was stated in the bill whereby the defendant was obliged to furnish the plaintiff's telephones and

telephone service of the kind described. Another ground of demurrer was, that by proper construction of the ordinance the defendant was not obliged to furnish telephones and telephone service of the kind described and at the rate claimed in the bill. The matters embraced in these grounds of demurrer were held to be such as should be brought before the court by way of answer.

A statute of the city limited the rate of charges for the use of telephones and defined "telephones" as used in the act. Another statute provided that contracts might be made for such special form of telephone service at such rates as might be agreed upon, provided the obligation of telephone companies furnishing, at the rates mentioned in the form of the act, the kind of service then provided by the Chesapeake and Potomac Telephone Company at such rates, should not be impaired. The court held that the ordinance limiting the company's rate of charges for telephone services was not, by these statutes, restricted in its application to the kind of telephone service described in them. The defendant further contended that the ordinance, in view of the condition existing when it was passed, should be construed as applying to a particular kind of service, different from that furnished to the complainants. This defense, the court said, was one that could not be set up by demurrer but required an answer. The court further held that the city council, under a section of the statute giving it power to regulate the use of the streets for telephone poles and wires, had authority to impose upon the company limitations of its rates as a condition of such use; and that the telephone company, after it had accepted the ordinance, was prevented denying its validity on the ground that the rates fixed were not reasonable.

The point was raised that the bill was multifarious, and the court held that this was not so although the bill alleged a contract by each of the four complainants with the company.

A DECISION BY THE COMPTROLLER OF THE TREASURY.

COMPTROLLER TRACEWELL has given an opinion to the United States disbursing agent of the Smithsonian Institution, on the question whether he can lawfully pay the increased rate of \$96 per annum for telephone service demanded by the Chesapeake and Potomac Telephone Company. In harmony with the act of Congress of June 30, 1898, the National Museum has paid the company \$50 per annum for each service on a separate wire connecting the Museum building with the residences of officials whom the public interest requires to be in telephonic communication with the Museum. Now the company presents an account in which it charges \$96. The Comptroller holds, in view of the decision of the Supreme Court of the District, October 30, of last year, and in the light of a previous United States Supreme Court decision, that the act of 1898 limiting telephone charges to \$50 per annum is confined in its application to the equipment and service known as the "grounded circuit" or "local service equipment," and that it does not apply to the "metallic circuit" or "long distance" telephone.

TELEPHONE COMPANY FINED SIX TIMES.

FOR the sixth time the Missouri and Kansas Telephone Company has permitted a default judgment to be taken against it in suits instituted by the city of Hannibal, Miss., on the charge of erecting poles and stringing wires in certain streets and alleys without the consent of the city authorities. The fines imposed now amount to \$900. Four of the cases have been appealed. The city attorney intends to file complaints so long as the company continues to violate the city ordinance. The company has no franchise in the city.

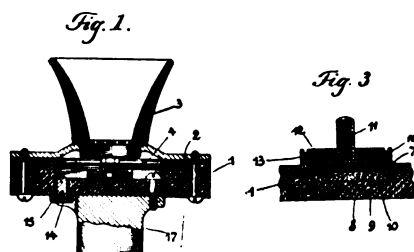
TELEPHONE



PATENTS

IMPROVED TELEPHONE TRANSMITTER.

A. W. Hill, of West Hoboken, N. J., patents (No. 759,441) and assigns to himself and the Phonic Carbon Company, an improved telephone transmitter. This invention is shown in the accompanying illustration and relates to an improvement in a transmitter whereby its construction may be cheapened and packing avoided. Fig. 1 is a section through an instrument, and Fig. 3 an



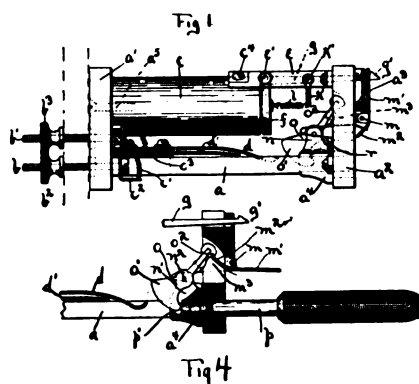
enlarged view of the carbon receptacle. 1 is a solid disc of carbon constituting the back of the transmitter and the rear electrode. 2 is the front of the instrument. At the center of the block 1 is provided a cavity which holds the granular material 8. 9 is the front electrode, which is fastened in usual way to the diaphragm 4. By means of the sleeve 16, which is of insulating material, the granular carbon is prevented from coming in contact with the sides of the receptacle.

TELEPHONE RECEIVER.

W. C. Runge, of London, England, patents (No. 759,316) an improved telephone receiver. The main feature of this invention consists in arranging the head of the receiver so that it can be adjustable upon the case by means of a screw thread and thereby providing means of adjusting the distance of the diaphragm from the magnets.

COMBINED JACK AND RESTORING DROP.

A. M. Knudsen, of Chicago, Ill., patents (No. 759,383) an improved combination of jack and drop and assigns to L. Sands, of Cleveland, Ohio. This invention is shown in the accompanying illustration, in which *c* is an iron-clad coil of an ordinary drop to which the lever *e* is attached that controls the shutter *m'*.



Beneath the drop are the springs *d* and *d'* of the jack. The inventor provides a pivot cam *o*, the end of which *o* is attached to come into contact with the end of the shutter *m'*, when the plug *p* is inserted through the hole *p'*. Thus the insertion of the plug tips the cam and restores the shutter.

TELEPHONE TRANSMITTER.

James I. Gemmill, of Cleveland, Ohio, patents (No. 759,094) an improved telephone transmitter. This transmitter belongs to the class termed "corn plaster" transmitters. The improvement consists in substituting an india rubber ring made out of rubber sponge, for the felt ring which is customary in this class of instrument. The inventor claims that the india rubber produces a ring

which is more resilient and less likely to become hardened in course of time than any fibrous material.

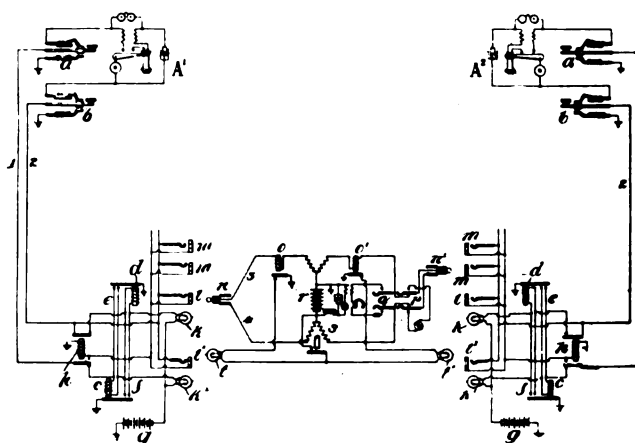
IMPROVED TELEPHONE HOOD.

R. D. Fannon, of Chicago, Ill., patents (No. 759,428) an improved transmitter hood and assigns to D. Dutton, of Carpentersville, Ill. In this invention the inventor attaches to the transmitter four hinged leaves which are shaped so as to enclose the face. When it is desired to speak into the transmitter, these leaves are turned inwards and nearly enclose the speaker's head.

TELEPHONE CIRCUIT FOR DIVIDED SWITCHBOARD.

E. H. Smythe, of Freeport, Ill., patents (No. 759,641 and No. 759,762) a circuit for divided telephone switchboards, and assigns to the Western Electric Company, of Chicago, Ill.

In these two patents Mr. Smythe shows a circuit intended for that class of switchboard known as divided board—that is to say, where the subscribers are essentially divided into two groups, each having a multiple of its own and each subscriber being supplied with two calling signals and answering jacks, one in



each group of the multiple. The accompanying diagram illustrates the essential features of both patents. Mr. Smythe provides at the central office two relays, *c* and *d*. At the substation there are two keys, *a* and *b*. A slight inspection of the circuit shows that if key *b* be depressed current will flow from battery *g* through relay *d*. This relay is then excited. When its armature closes it short circuits relay *c*. Simultaneously the line lamp *k* is illuminated. Conversely, if key *a* be depressed relay *c* is excited and relay *d* short-circuited, the relay *k'* is illuminated. When the receiver is removed from the hook the cut-off relay *h* is energized and both relays and signals cut away from the line.

IMPROVED ELECTRIC CABLE.

J. Frisch, of Mülheim-on-the-Rhine, Germany, patents (No. 759,981) an improved form of telephone cable and assigns to Felten & Guillaume, Carlswerk, Actien-Gesellschaft. This cable falls into the catalogue of air space paper cables. The inventor provides a three part diaphragm of paper or other insulating material and lays a conductor in each of the angles formed by the paper walls. The whole is then surrounded by a paper tube and is made up of as many of these paper cables as may be desired.

TELEPHONE RECEIVER.

E. H. Strauss, of Chicago, Ill., patents (No. 758,795) an improved telephone receiver. This receiver belongs to the class constructed by forming a pressed copper, brass or soft metal cup, to which the magnet or pole pieces are fastened. In this particular device, the bolt holding the pole pieces and magnet is inserted in an oval slot, which permits the pole pieces being adjusted with reference to the diaphragm.

SOME OF OUR CUSTOMERS

in Poles and Ties telegraph us their orders.

Do we need say more?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Bessemer Building.

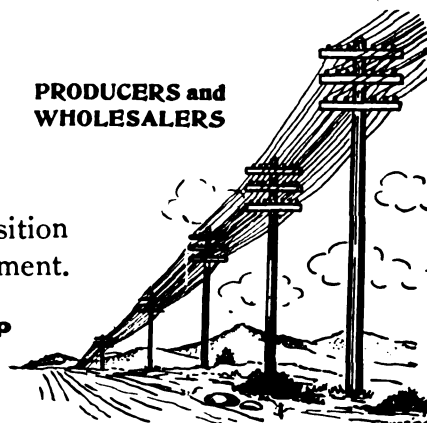
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

PRODUCERS and
WHOLESALEERS



"From the Stump
to the Line."



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

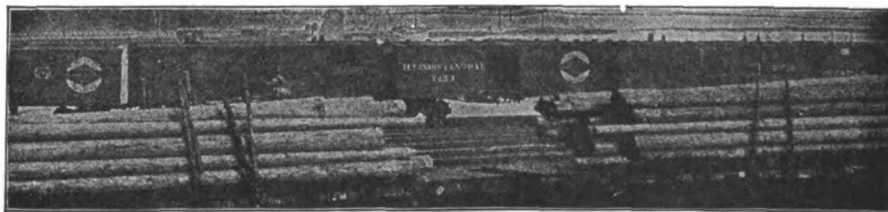
Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock
Prompt Ship-
ment.



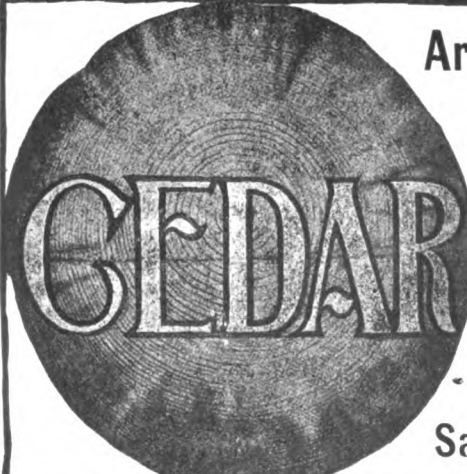
LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



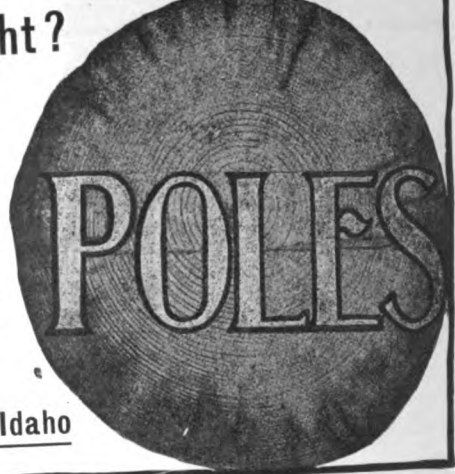
Are You Buying Poles Right?

Are You SURE You ARE?

When in doubt—write us

We are producers on a large scale and have ready for immediate shipment a large stock of all sizes of fine grade Cedar Poles, and the price is strictly right. Ask us for quotations—it may save you many dollars.

Sand Point Cedar Co., Sand Point, Idaho



Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

**Index
of the
Technical
Press**

**INDEX
DE LA
PRESSE
TECHNIQUE**

**Index
der
Technischen
Presse**

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

The Valentine-Clark Co.

*Beg to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Scribner, A. C. 11	Chicago Insulated Wire Co., Chicago, Ill. 11
Spargo, James A., Wire Co. 34	Kellogg Switchboard & Supply Co., Chicago, Ill. 12
Standard Underground Cable Co. 12	Nagel, W. G., Electric Co., Toledo, O. 34
Standard Vitrified Conduit Co. 36	National Wire Corporation, New Haven, Conn. 11
Stanton, L. W. 34	Okonite Co., New York. 12
Sterling, W. C., & Son 33	Roebing's Sons Co., John A. Trenton, N. J. 30
Sterling Electric Co. 11	Standard Underground Cable Co., Pittsburg, Pa. 34
Stromberg-Carlson Telephone Mfg. Co. 4	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. 3
Swedish-American Tel. Co. 12	
Telephone Printing Co. 34	CABLE HANGERS.
Valentine Clark Co. 30	Bissell Co., The F., Toledo, O. 3
Vought-Berger Co. 7	Cook, Frank B., Chicago, Ill. 3
Wanted, Situations, etc. 352	Nagel, W. G., Electric Co., Toledo, O. 3
Weston Electrical Instrument Co. 34	National Telephone Supply Co., Cleveland, O. 3
Wisconsin Timber & Land Co. 33	Standard Underground Cable Co., Pittsburg, Pa. 3
Worcester, C. H., Co. 29	
Yesbera Mfg. Co. 3	CABLE SLEEVES.
	Nagel, W. G., Electric Co., Toledo, O. 3
ATTORNEYS.	New Haven Novelty Machine Co., New Haven, Conn. 3
Munk, Otto, New York City. 3	
BATTERIES.	CARD INDEX SYSTEMS.
Electric Appliance Co., Chicago, Ill. 3	Telephone Printing Co., Defiance, Ohio. 3
Mungesser Electric Battery Co., Cleveland, O. 3	
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill. 3	CIRCUIT CLOSERS.
BLANKS, BOOKS AND FORMS.	Garton-Daniels Co., Keokuk, Ia. 3
Telephone Printing Co., Defiance, Ohio. 3	
BONDS.	CLIMBERS.
J. W. Middleton & Co., Chicago, Ill. 3	Klein & Sons, Mathias, Chicago, Ill. 3
BRASS.	Nagel, W. G., Electric Co., Toledo, O. 3
Benedict & Burnham Brass & Copper Co., Chicago, Ill. 3	
Scovill Mfg. Co., Chicago, Ill. 3	CONDUITS.
BOOTHES.	American Conduit Co., Chicago, Ill. 3
Yesbera Mfg. Co., Toledo, O. 3	American Vitrified Conduit Co., New York. 3
CABLE CLIP.	Camp Co., The H. B., New York. 3
Bullard & McElligott, Pittsburgh, Pa. 3	Gest, G. M., Cincinnati, O. 3
Cameron Appliance Co., Boston, Mass. 3	Nagel, W. G., Electric Co., Toledo, O. 3
National Tel. Supply Co., Cleveland, O. 3	Standard Vitrified Conduit Co., New York. 3
CABLES.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo. 3
American Electric Tel. Co., Chicago, Ill. 3	
Bissell Co., The F., Toledo, O. 3	

CONTINUED ON PAGE 31.

NEW TRUNKS

ARE NOT AS GOOD AS

EXPANDED**Metal Lockers**

FOR YOUR OPERATORS.

A Safe and Sanitary place to leave wraps.
Increases the efficiency of your Exchange.
In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.

WE HELP TO MAKEA Good
Telephone

ADDRESS 'BARRARM,' CLEVELAND

**Insulated
Electrical
Wires and Cables**

RDEBLING

**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.

TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

Agencies and Branches
**CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

ADVERTISERS' DIRECTORY—Continued**CONNECTORS.**

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., To-
ledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chi-
cago, Ill.
Electric Appliance Co., Chicago,
Ill.
Erner Hopkins Co., Columbus, O.
Farr Tel. & Const. Supply Co.,
Chicago, Ill.
Hemingray Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Leslie, A. C., & Co., Montreal,
Can.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago,
Ill.

CORRESPONDENCE SCHOOL.

American School of Correspond-
ence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Townsend Cedar & Supply Co.,
Chicago, Ill.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg,
Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Miller Anchor Co., Norwalk, O.
Nagel, W. G., Electric Co., To-
ledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington,
Ky.
Nagel, W. G., Electric Co., To-
ledo, O.

LATHES.

Scribner, A. C., Gloversville,
N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MAGNETS.

Leslie, A. C., & Co., Montreal,
Can.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co.,
Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

PINS AND BRACKETS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.

Central Mfg. Co., Chattanooga,

Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Prosser & Son, L., Scottsburg,
Ind.

POLES.

Beidler, Francis, & Co., Chicago,
Ill.
Bissell Co., The F., Toledo, O.
Bushnell, A., Kansas City, Mo.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City,
Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City,
Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane,
Wash.
Pendleton & Gilkey, Minneapolis,
Minn.
Pittsburg & Lake Superior Iron
Co., Escanaba, Mich.
Sand Point Cedar Co., Sand
Point, Idaho.
Sterling, W. C., & Son, Monroe,
Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co.,
Mattoon, Wis.
Worcester, C. H., Co., Chicago,
Ill.

POLE STEPS.

Inland Steel Co., Chicago, Ill.

PROTECTORS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Fostoria Electric Supply Co., Fos-
toria, Ohio.
Kellogg Switchboard & Supply
Co., Chicago, Ill.

CONTINUED ON PAGE 37.

POLE STEPS

**PLAIN AND
GALVANIZED**



9-16 X 9, 5-8 X 9, 5-8 X 10
INCH
Other Sizes Made to Order

**We make our own steel and do our own galvanizing, therefore
lowest possible prices and quick shipment.**

INLAND STEEL COMPANY, CHICAGO First National Bank Building

Cedar Poles

We Have a Large Stock for Prompt Shipment.

INDIAN

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

WRITE FOR PRICE NOW.

MINNESOTA

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1808 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, WIS.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

American Telephone Practice

By KEMPSTER B. MILLER, M. E.

518 large pages, profusely illustrated with 380
diagrams and cuts of apparatus

\$3.00

A book for the telephone man. It is an encyclopedia of useful information concerning telephony. It gives complete specifications, enabling you to intelligently order apparatus from manufacturers, and to properly supervise the installation of an exchange, large or small. It describes in simple language the theory and practice of modern telephony, including circuits, mechanical construction and operation of telephones and switchboards. A complete description is given of storage batteries, their care and maintenance; of aerial and underground line construction, and, in fact, all the important matters which telephone men need to know.

Sent Prepaid on Receipt of Price by AMERICAN TELEPHONE JOURNAL

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO., MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Pendleton & Gilkey
816 Lumber Exchange,
Minneapolis, Minn.

POLE PRODUCERS.
We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

Cost of Construction Reduced
By Purchasing Chestnut Telephone
POLES and POSTS
From FRANK MULLEN, Ewing, IND.
Reasons Why for the Asking

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.
CEDAR POLES
We aim to please. Try us with your Order.

Attractive Prices
—
Prompt Dispatch
—
Good Quality . . .

LARGE SIZES OF
**CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES**
For Special Use Carried in Full Stocks and
Sold at Reasonable Prices
THE MEDORA MILLING CO.,
MEDORA, INDIANA

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:
Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US
L. Prosser & Son, SCOTTSBURG, INDIANA.

E. OHUROHILL
HERON, MONT.

YARDS {
HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR
POLES
25 to 80 ft. long.

W. C. STERLING & SON
MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Make a Specialty of Telephone Poles.	P O L E S	Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines
YARDS: Menominee, Mich. Escanaba, " " Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.		FRANCIS BEIDLER & CO. 459-519 W. 22d St. CHICAGO, ILL.

We Rush Orders...

COHN & BOCK

YELLOW PINE • CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

**The American
Telephone Journal**

**116 Nassau Street,
New York City.**

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART, cross ties, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly.
R. R. ARMS, Manager.
LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

Do you always mention the

**American
Telephone
Journal**

*when writing to advertisers?
It will be appreciated by all
concerned if you do.*

23 Years' Experience Guarantees Satisfaction.
WRITE YOUR WANTS TO

CHICAGO
Telephone Apparatus Exchange
TELEPHONE ACCESSORIES
BOUGHT, SOLD AND EXCHANGED
17 S. Elizabeth Street, CHICAGO, ILL.



J. W. Middleton & Co.
PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.
167 Dearborn St.

Do you always mention the

American Telephone Journal

when writing to advertisers? It will be
appreciated by all concerned if you do.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR**

Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

Blank Books and Forms

FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO

CYPRESS POLES Creosoted and Treated with Chloride of Zinc

IF YOU WANT a telegraph pole THAT WILL OUTLAST ANY TWO CEDAR POLES, get the above.
No decay. No dry rot. Nothing to give way. Test poles SOUND AFTER THIRTY YEARS. Price on
long lengths same as cedar. Short lengths about one-third higher. Address

A. BUSHNELL, 903 Broadway, KANSAS CITY, MO.

The Erner Hopkins Co. Wholesale
Electrical
Supplies

WRITE US FOR PRICES.

WE CAN SAVE YOU MONEY.

The ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.

Manufacturers of BARE and TINNED

COPPER WIRE

Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.

ROME, N. Y.

Chicago Office: 1501 Monadnock Bldg.,
CHICAGO.

Keeling & Ridge Co.

General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 551-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

**WESTON STANDARD
PORTABLE
DIRECT READING**

Voltmeters, Ammeters, Millivoltmeters, Voltammeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,

Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.

PRICE LIST AND SAMPLES ON APPLICATION

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS

87 West Van Buren St., CHICAGO, ILL.

COOK PROTECTORS

STANDARD



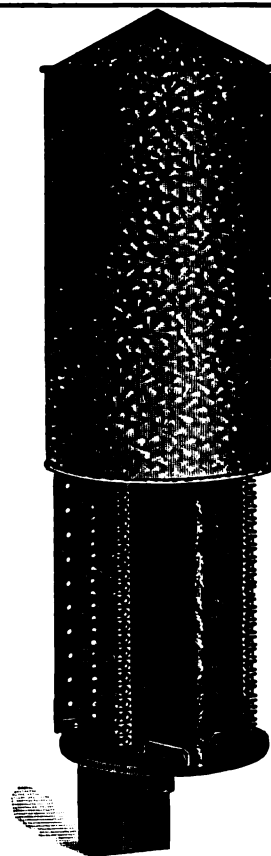
Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF

FRANK B. COOK

240 - 244 W. LAKE ST.

CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

THE NORTH-WESTERN LINE

California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.

THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.

THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.

W. B. KNISKERN,
Passenger Traffic Manager,
Chicago.

To Upper Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

**Chicago, Milwaukee & St. Paul
Railway.**

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,

CHICAGO, ILL.

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.



P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

**39-41 Cortlandt Street,
NEW YORK.**

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Mortuaries Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S (Patent) CONNECTORS AND TERMINALS

THE C. McINTIRE CO.
13-15 Franklin St., Newark, N. J.

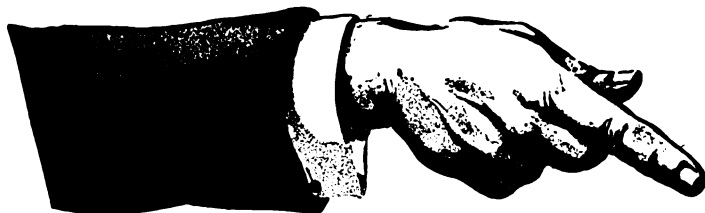
Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men. This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE—This offer is not good on Renewals.

Name _____
 Street Address _____
 Town _____ State _____

American Telephone Journal
 116 Nassau Street, New York City
 Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.

ADVERTISERS' DIRECTORY—Concluded

Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.
PAY STATIONS.
 Nagel, W. G., Electric Co., Toledo, O.
RAILROADS.
 Chicago, Burlington & Quincy Ry. Co.
SEALS.
 Middleton & Co., J. W., Chicago, Ill.
STATIONERY.
 Gildart Bros., Albion, Mich.
 Telephone Printing Co., Defiance, Ohio.
STEEL.
 Leslie, A. C., & Co., Montreal, Can.
STOCK CERTIFICATES.
 Middleton & Co., J. W., Chicago, Ill.
STORAGE BATTERIES.
 National Battery Co., N. Y. City.
SWITCHBOARDS.
 American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Conn. Tel. & Electric Co., Meriden, Conn.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Ericsson Telephone Co., N. Y.
 Farr Tel. & Const. Supply Co., Chicago, Ill.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Western Tel. Mfg. Co., Chicago, Ill.
TELEPHONES.
 American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Chicago Telephone Apparatus Exchange, Chicago, Ill.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 De Veau Telephone Mfg. Co., New York.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnestock Transmitter Co., New York.
 Farr Tel. & Const. Supply Co., Chicago, Ill.
 Hipwell Mfg. Co., Allegheny, Pa.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Monarch Telephone Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.

Western Tel. Mfg. Co., Chicago, Ill.
TELEPHONE BLANKS.
 Telephone Printing Co., Defiance, Ohio.
TELEPHONE BOOTHS.
 Yesbera Manufacturing Co., Toledo, Ohio.
TELEPHONE HOLDER.
 Chicago Writing Machine Co., Chicago, Ill.
TELEPHONE SUPPLIES.
 American Electric Tel. Co., Chicago, Ill.
 Automatic Electric Co., Chicago, Ill.
 Barr, W. J., Mfg. Co., Cleveland, Ohio.
 Bissell Co., The F., Toledo, O.
 Central Tel. & Elect. Co., St. Louis, Mo.
 Century Telephone Const. Co., Buffalo, N. Y.
 Chicago Telephone Apparatus Exchange, Chicago, Ill.
 Chicago Writing Machine Co., Chicago, Ill.
 Connecticut Telephone & Electric Co., Meriden, Conn.
 Couch, S. H., Co., Boston, Mass.
 De Veau Telephone Mfg. Co., New York.
 Eastern Tel. Mfg. Co., W. Chester, Pa.
 Electric Appliance Co., Chicago, Ill.
 Ericsson Telephone Co., N. Y.
 Fahnestock Transmitter Co., New York.
 Farr Tel. & Const. Supply Co., Chicago, Ill.
 Hipwell Mfg. Co., Allegheny, Pa.
 Holtzer-Cabot Electric Co., Chicago, Ill.
 International Telephone Mfg. Co., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Leslie, A. C., & Co., Montreal, Can.
 Monarch Tel. Mfg. Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
 Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
 Swedish-American Tel. Co., Chicago, Ill.
 Vought-Berger Co., La Crosse, Wis.
 Yesbera Mfg. Co., Toledo, O.
TERMINALS.
 American Electric Tel. Co., Chicago, Ill.
 Cook, Frank B., Chicago, Ill.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 McIntire Co., C., Newark, N. J.
 Nagel, W. G., Electric Co., Toledo, O.
 Sterling Electric Co., Lafayette, Ind.
TOLL TICKETS.
 Gildart Bros., Albion, Mich.
 Telephone Printing Co., Defiance, Ohio.
TRANSMITTER ARMS.
 Barr, W. J., Mfg. Co., Cleveland, Ohio.
WIRE.
 American Electric Tel. Co., Chicago, Ill.
 Bissell Co., The F., Toledo, O.
 Chicago Insulated Wire Co., Chicago, Ill.
 Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Nagel, W. G., Electric Co., Toledo, O.
 National Wire Corporation, New Haven, Conn.
 Okonite Co., New York.
 Roebling's Sons Co., John A., Trenton, N. J.
 Scovill Mfg. Co., Chicago, Ill.
 Spargo, James A., Wire Co., Rome, N. Y.
 Standard Underground Cable Co., Pittsburgh, Pa.
WOOD PRESERVER.
 Bruno Grosche & Co., New York.
 Bushnell, A., Kansas City, Mo.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



**Experience
is a wise teacher**
We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==

"CAMP DUCT"

Always come back for more.

Pretty good sign, isn't it?

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

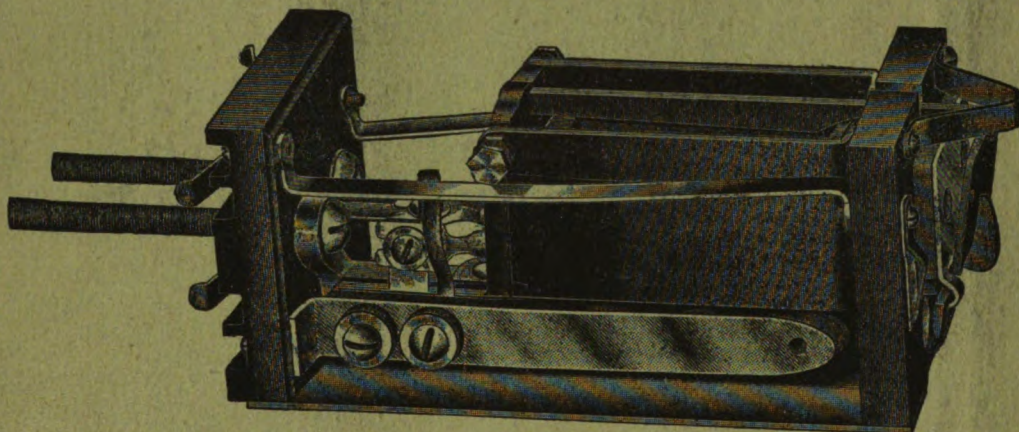
Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

IMPROVED AMERICAN EXPRESS SWITCHBOARDS BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

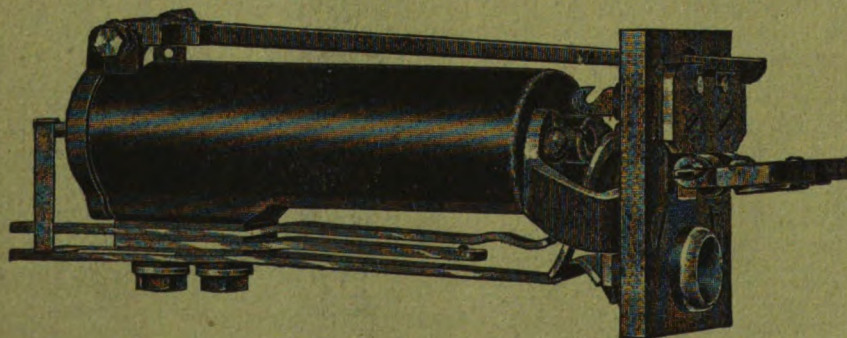
**SELF-CONTAINED DROPS AND JACKS
RAPID RINGING DEVICE**

All drops restored to normal position by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10.



**AT
POPULAR
PRICES**

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

THE AMERICAN TELEPHONE JOURNAL

Once a week at least

You grease your wagon axle. You know that otherwise it would creak and groan and wear out quickly.

Why, then, don't you show your business the same consideration? Use the "business lubricator"—*advertising*.

On your axle you use the best grease you can get. You should also use the best lubricator for your business "creaking." That means, in advertising, the *BEST* medium, which is understood to be the periodical with the largest circulation and the right class of readers.

THE AMERICAN TELEPHONE JOURNAL has a larger circulation than all other telephone papers combined.

The high class of its editorial contents make it indispensable to practical telephone men—the men who buy.

They read it because they have to pay for it in *advance*.

If your wagon axle needs greasing once a week, don't you think your business also requires it once a week?

The axle would wear out were it only greased once a month.

How, then, can you expect your proper share of trade if you advertise only once a month?

THE AMERICAN TELEPHONE JOURNAL is a weekly, and the only weekly paper reaching the telephone trade.

Every business needs advertising more than an axle requires grease. When you want to push your business, *advertise*; when you are ready to retire, stop advertising—not before.

Edited by WILLIAM HENRY McDONOUGH

Volume 9

NEW YORK—JUNE 4, 1904—CHICAGO

Number 23

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Advertisers' Directory, Page 9

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$2.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

THE JANUS TELEPHONE SYSTEM.....By Dr. A. Gradenwitz
CORPORATION TELEPHONES.....By A. R. Bennett
HINTS ON THE CARE OF TELEPHONE BATTERY PLANTS.....By Charles D. Spencer
AN ELECTRIC SOLDERING IRON CORD REEL.....By Otis J. Dorwin

The Operating Field:

OHIO TELEPHONE ASSOCIATION MEETING
PROGRESS OF INDEPENDENT TELEPHONY SHOWN AT ST. LOUIS EXPOSITION
CENTRAL STATES TELEPHONE ASSOCIATION MEETING
THE BELL COMPANY OUTGENERALED
THE OTTUMWA (IOWA) TELEPHONE PLANT FOR SALE
HOW THE BELL TELEPHONE COMPANY'S METHOD FAILED
THE FORT WAYNE COMPANY PROSPERS
INCREASED SERVICE AREA FOR THE P. AND A.
INDEPENDENT TELEPHONY AT SOUTH BEND, IND.
THE QUEEN CITY TELEPHONE COMPANY WINS
A CONVENIENT METHOD OF PULLING POLES, by E. C. Starks
QUERIES
THE EDITOR'S PAGE
TRADE NOTES
PATENTS.
THE WEEK'S MESSAGES
WANT AND FOR SALE ADVERTISEMENTS, PAGE 368

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first-class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

"SPECIAL" Telephone Condensers

The "Special" Condensers are of standard design, and are superior, due to their absolute uniform capacity and ability to stand high voltage without break down.

They are of high insulation resistance.

The "Special" is made to withstand a voltage of 250 volts alternating current indefinitely, without injury or leaking appreciably. The insulation resistance is forty meg-ohms per microfarad, and the greatest variation in capacity will not be over 5 per cent. of the rated capacity.

The "Special" Condenser is neatly and hermetically sealed in metal cases mounted with hard rubber terminals, and tinned brass terminal lugs.

For full information regarding Condensers and about everything else in the telephone line you should have our General Telephone Catalogue No. 19, and Telephone Parts Catalogue No. 21.

Electric Appliance Company,

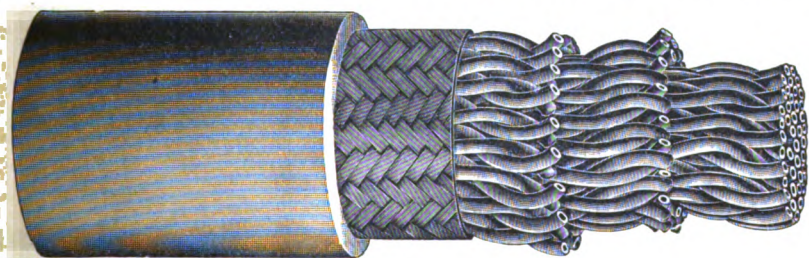
Telephone Manufacturers. Electrical Supplies.

92 and 94 W. VAN BUREN ST.,

CHICAGO.

WRITE FOR SAMPLE CARD OF WIRES.

Manufacturers of



"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

SUBSCRIPTION BLANK

Cut this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

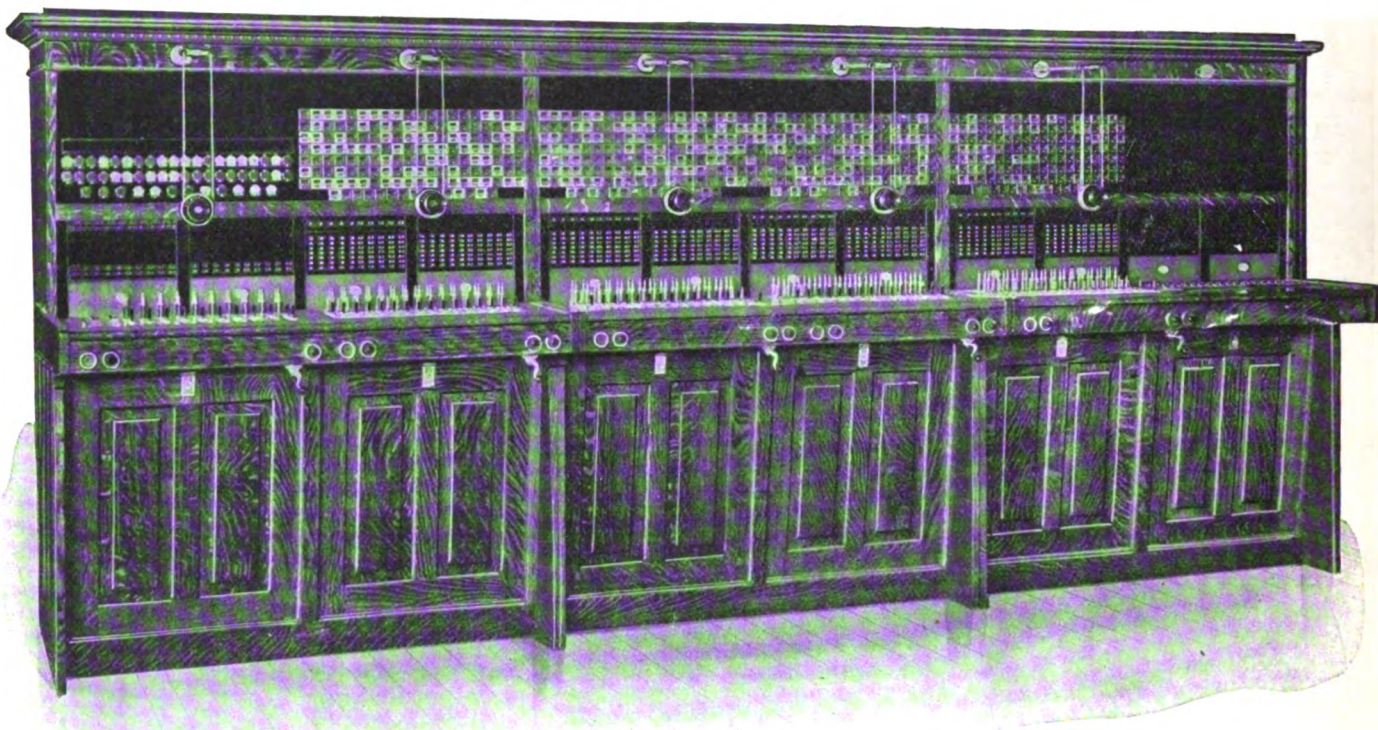
Name.....

P. O. Address.....

Generator Call Visual Signals

We made this type of equipment popular by manufacturing a signal that is simple, reliable and easy to install

A 50-line exchange can with this type of equipment give as rapid service as would be required of an exchange ten times as large



The above board was installed in Missouri

It is equipped with Generator Call Visual Signals

There's lots of satisfaction in operating one of these switchboards

It gives rapid service--reduces operating expenses

THE BEST RECOMMENDATION IS THE USER


DESCRIPTIVE PRINTED MATTER MAILED UPON REQUEST

Stromberg-Carlson Tel. Mfg. Co.

GEN'L & AND EASTERN SALES OFFICE
ROCHESTER, N. Y.

SALES DEPT.
CHICAGO, ILL.

Kellogg Telephone Apparatus

FAR and away the first in rank and the acknowledged
 "standard of excellence" throughout the world.
"Of a quality equal to Kellogg" is stipulated in
government specifications for telephones and kindred
apparatus.

Write for our prices in the magneto line. They are but
little higher than the host of makes that claim equal merits.

Kellogg Switchboard and Supply Co.
Green and Congress Streets, Chicago

Reliance Building, Los Angeles

Electric Building, Cleveland
Keystone Telephone Building, Philadelphia

HIPWELL MANUFACTURING COMPANY, ALLEGHENY, PA. High Grade Long Distance Telephones



FARMERS' TELEPHONES

AND TELEPHONE SUPPLIES
LINEMEN TOOLS, BATTERIES, WIRE, BRACKETS, PINS,
CROSS-ARMS, BRACES, LAG BOLTS.

Quick Shipments. Prices are Right.
HIGH GRADE TELEPHONES AND SWITCHBOARDS.

FARR TELEPHONE & CONST. SUPPLY CO., CHICAGO.



Exchange Telephones

and Private Line Telephones,
Express Switchboards, Gong
Switchboards, Large or Small
Transmitters, Receivers and
Hooks.

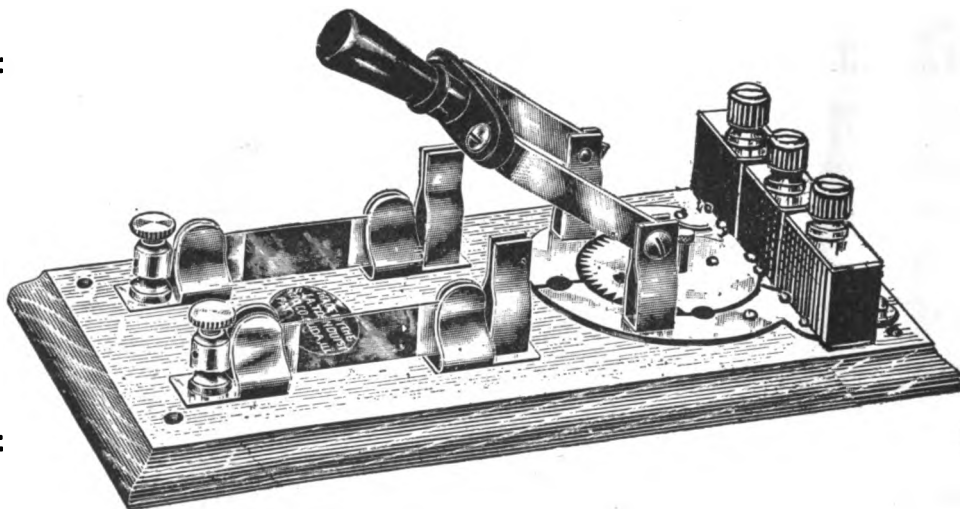
A set of Bookkeeping Blanks and Ledgers Free with a \$10.00 Order.



KING OF PROTECTORS

*The New "Tornquist" Combination Lightning
Arrester, Ground Switch, Fuse and Lever Cut-out*

*Wood or
Porcelain
Base
Also Single
Pole*



*Sample on
Approval
Express
Prepaid*

HART & CO., Inc., Gen. Agts., Monadnock Bldg., Chicago

*Our **Automatic Telephone** installation at the
St. Louis Exposition is the most remarkable electro-mechanical
exhibit at the big show. You will find it in the Palace of
Electricity, section 24. Inside this great palace we have built a
little palace. You are cordially invited to call.*

Automatic Electric Company,
CHICAGO, U. S. A.

Reasons

1. *Good material.*
2. *Skilled workmanship.*
3. *Careful inspection and most important.*
4. *An Honest Endeavor to produce the best.*

In Eastern Telephones
you get all these.

WRITE US

Eastern Telephone Mfg. Co.
WEST CHESTER, PA.



*A Comfort
in a
Comfortable
Home*

*A Luxury
in a
Luxurious
Home*

*A
Convenience
in any
Home, or
Anywhere*

*At the Cost
of a
Necessity*

"Coaxing Papa."
OVER

THE PENDENT TELEPHONE

"THAT HANGS FROM THE CEILING"

Sometimes it's nice to be coaxed, and to yield under persuasion

We have persuaded thousands to use THE PENDENT—and they are glad that we were persistent

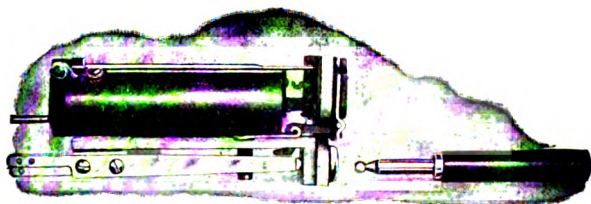
**Don't You Want to Try It? Simply Write
THE VOUGHT-BERGER CO., LaCrosse, Wis.**

Makers of First-Award Telephones, Switchboards and Appliances

IN THE "International" SWITCHBOARD

the automatic restoration of the drop is "*Accomplished by means dissimilar to the contact of the plug with the drop as the plug enters the jack.*"

(See the decision)



It Don't Infringe

"International" drop fully protected by patents allowed, and
Guaranteed Absolutely Non-Infringing

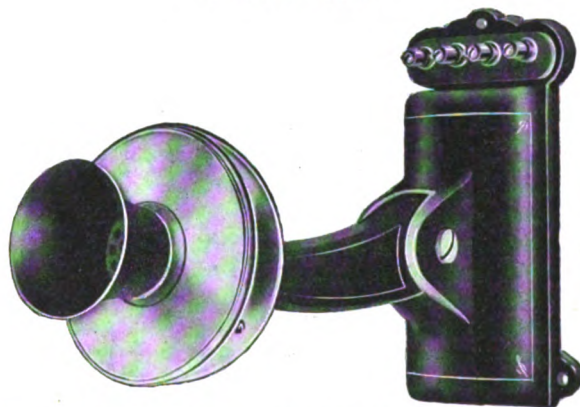
A SAMPLE

will convince you that it is electrically and mechanically perfect

International Telephone Mfg. Co.
Harrison and Clinton Streets, Chicago, U. S. A.

Couch No. 32 Transmitter

UNSURPASSED



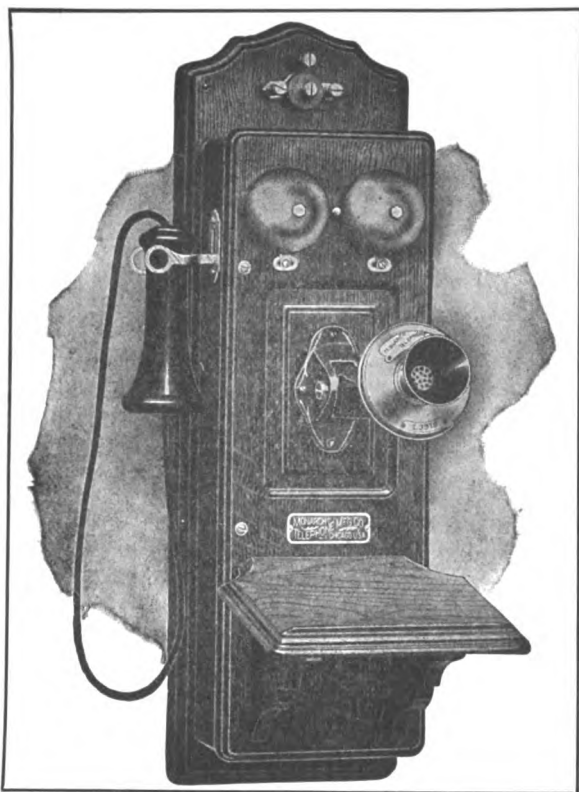
Being No. 30 Mounted on No. 320 Adjustable Arm with
Induction Coil in Base.

In a Class by Itself

Has been made the same way for years, never necessitating any change.

Get a sample and play ball with it, or drop it out of the window, then note how well it will talk.

S. H. COUCH CO.
162 Pearl St. Boston, Mass.



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.



SOMETHING NEW

Our new Automatic Intercommunicating Telephone for Business offices, arranged for Branch office exchange connection, on either common or local city exchange service.

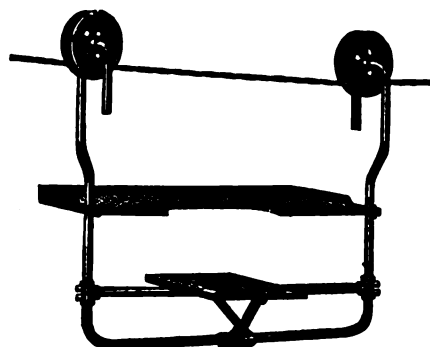
LOW IN PRICE. NO CENTRAL OPERATOR

For the Up-to-Date Exchange Man.

BULLETIN SENT ON REQUEST.

Conn. Telephone & Elec. Co.
MERIDEN, CONN., U. S. A.

A Comfortable Upper Berth.



No line work is as dangerous as "Cooning a Messenger."—Our "Security" Messenger Cable Cars are **Safe, ABSOLUTELY,** and comfortable. (Tested for 1000 lbs.)

Write for new Booklet 118 A. T.

THE F. BISSELL COMPANY

Manufacturers and Jobbers of

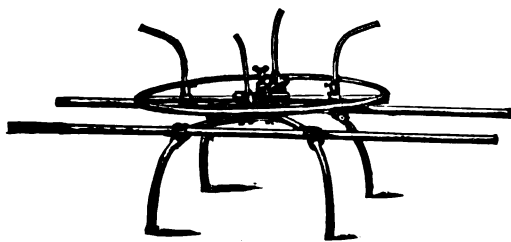
TELEPHONE SUPPLIES

226-228-230 HURON STREET

TOLEDO, O.

"READY" PAY OUT REELS

Pat. June 13, July 27, Oct. 23, 1903.



Before buying construction tools write us for prices and descriptive matter. "Ready" Reels are made in ten styles, all Iron, Cone Bearings, Light and Strong. "Ready" Reels are handled by **All Jobbers.**

1900 Dry Batteries

The 1900 Dry Battery is an ideal Dry Battery for telephone use. Each Battery is guaranteed by the manufacturer, has long life, High Electromotive force, and large amperage.

A trial order will convince.

The W. G. Nagel Electric Co.

Toledo, O.



ADVERTISERS' DIRECTORY

American Conduit Co.....	36	Camp, The H. B. Co.....	39
American Electric Teleph. Co.....	40	Central Mfg. Co.....	—
Am. School of Correspondence.....	—	Central Telephone & Electric Co.....	—
American Vitrifed Conduit Co.....	30	Century Telephone Const. Co.....	11
Automatic Electric Co.....	6	Chicago, Burlington & Quincy Ry. Co.....	35
Barr, W. J., Mfg. Co.....	31	Chicago Insulated Wire Co.....	—
Beidler, Francis & Co.....	33	Chicago Writing Machine Co.....	10
Benedict & Burnham Brass & Copper Co.....	—	Churchill, E.....	33
Bissell Co., The F.....	8	Cohn & Bock.....	33
Bruno Grosche & Co.....	12	Columbia Mfg. Co.....	33
Bullard & McElligott.....	12	Connecticut Teleph. & Electric Co.....	8
Bushnell, A.....	34	Cook, Frank B.....	—
Hutterfield, J. F.....	34	Couch, S. H., Co.....	7
Cameron Appliance Co.....	32	Crumb, W. H., Co.....	36

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

De Veau Tel. Mfg. Co.....	—	Lewis Lumber & Mfg. Co.....	33
Dickey Clay Mfg. Co., W. S.....	36	Lindsay Bros. Co.....	32
Eastern Telephone Mfg. Co.....	7	McIntire, C., Co.....	36
Electric Appliance Co.....	10	Maltby Lumber Co.....	29
Ericsson Telephone Co.....	34	Medora Milling Co.....	33
Erner Hopkins Co.....	34	Merritt & Co.....	31
Fahnestock Transmitter Co.....	30	Michigan Cedar Co.....	33
Farr Tel. & Const. Supply Co.....	29	Middleton, J. W., & Co.....	34
Fowler, John H.....	29	Monarch Telephone Mfg. Co.....	8
Garton-Daniels Co.....	11	Mullen, Frank.....	33
Gest, G. M.....	38	Munk, Otto.....	9
Hart & Co.....	6	Nagel, W. G. Electric Co.....	9
Hemingray Glass Co.....	6	National Battery Co.....	9
Hipwell Mfg. Co.....	6	National Telephone Supply Co.....	—
Holtzer-Cabot Electric Co.....	6	National Wire Corporation.....	35
Imperial Finance & Cons. Co.....	34	New Haven Novelty Machine Co.....	2
Indiana Rubber & Insulated Wire Co.....	3	Nungesser Electric Battery Co.....	—
Index of the Technical Press.....	30	Okonite Company.....	34
Inland Steel Co.....	32	Pacific Coast Pole Co.....	30
International Telephone Mfg. Co.....	32	Pendleton & Gilkey.....	33
Keeling & Ridge Co.....	34	Pignolet, L. M.....	32
Kellogg Switchboard & Supply Co.....	34	Pittsburg Lake Superior Iron Co.....	29
Klein, Mathias, & Sons.....	5	Prosser & Son, L.....	33
Lanz M., & Sons.....	34	Roebbling's, John A., Sons Co.....	31
	12	Sand Point Cedar Co.....	30
		Scovill Mfg. Co.....	2

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



STORAGE BATTERIES

UP-TO-DATE

TELEPHONE BATTERIES

MUST HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

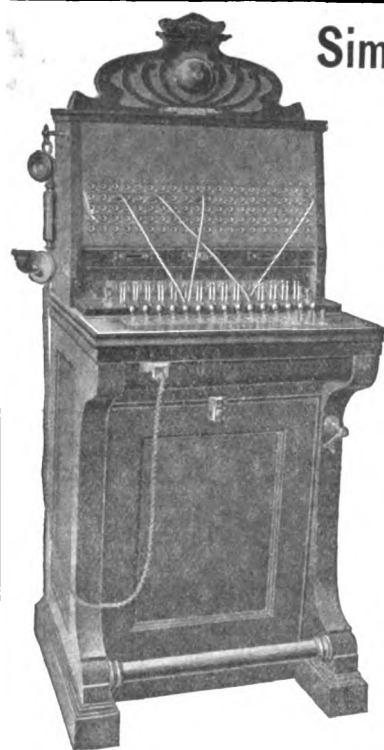
FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



Simple to Operate

New combination drop and jack board. Has a smaller reach than any board of like capacity.

Any number of drops installed; additional ones can be put in without trouble.

The only combination jack and drop fastened to the frame by one nut.

Automatic clearing out signals.

Write today for further particulars

ERICSSON TELEPHONE CO.
296 Broadway, New York

Scribner, A. C..... 11	Kellogg Switchboard & Supply Co., Chicago, Ill.
Spargo, James A., Wire Co..... 34	Nagel, W. G., Electric Co., Toledo, O.
Standard Underground Cable Co. 12	National Wire Corporation, New Haven, Conn.
Standard Vitrified Conduit Co..... 36	Okonite Co., New York.
Stanton, L. W..... 34	Roebbing's Sons Co., John A., Trenton, N. J.
Sterling, W. C., & Son..... 33	Standard Underground Cable Co., Pittsburg, Pa.
Sterling Electric Co..... 11	Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Stromberg-Carlson Telephone Mfg. Co. 4	
Swedish-American Tel. Co..... 12	CABLE HANGERS.
Telephone Printing Co..... 34	Bissell Co., The F., Toledo, O.
Valentine Clark Co..... 30	Bullard & McElligott, Pittsburg, Pa.
Vought-Berger Co. 7	Cook, Frank B., Chicago, Ill.
Wanted, Situations, etc..... 368	Nagel, W. G., Electric Co., Toledo, O.
Western Electrical Instrument Co. 34	National Telephone Supply Co., Cleveland, O.
Wisconsin Timber & Land Co..... 33	Standard Underground Cable Co., Pittsburg, Pa.
Worcester, C. H., Co..... 29	CABLE SLEEVES.
Yesbera Mfg. Co..... —	Nagel, W. G., Electric Co., Toledo, O.
ATTORNEYS.	New Haven Novelty Machine Co., New Haven, Conn.
Munk, Otto, New York City.	CARD INDEX SYSTEMS.
BATTERIES.	Telephone Printing Co., Defiance, Ohio.
Electric Appliance Co., Chicago, Ill.	CIRCUIT CLOSERS.
Mungesser Electric Battery Co., Cleveland, O.	Garton-Daniels Co., Keokuk, Ia.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.	CLIMBERS.
BLANKS, BOOKS AND FORMS.	Klein & Sons, Mathias, Chicago, Ill.
Telephone Printing Co., Defiance, Ohio.	Nagel, W. G., Electric Co., Toledo, O.
BONDS.	CONDUITS.
J. W. Middleton & Co., Chicago, Ill.	American Conduit Co., Chicago, Ill.
BRASS.	American Vitrified Conduit Co., New York.
Benedict & Burnham Brass & Copper Co., Chicago, Ill.	Camp Co., The H. B., New York.
Scovill Mfg. Co., Chicago, Ill.	Gest, G. M., Cincinnati, O.
BOOTHES.	Nagel, W. G., Electric Co., Toledo, O.
Yesbera Mfg. Co., Toledo, O.	Standard Vitrified Conduit Co., New York.
CABLE CLIP.	W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Bullard & McElligott, Pittsburgh, Pa.	
National Tel. Supply Co., Cleveland, O.	
CABLES.	
American Electric Tel. Co., Chicago, Ill.	
Bissell Co., The F., Toledo, O.	
Chicago Insulated Wire Co., Chicago, Ill.	

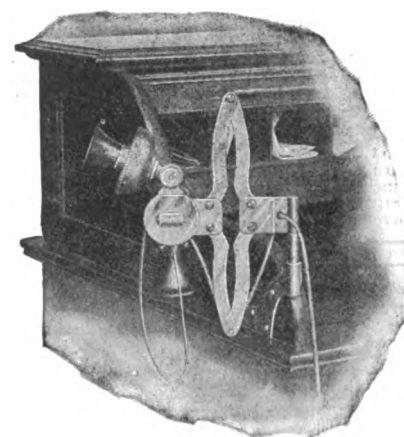
CONTINUED ON PAGE 31.

Adaptability

IS THE KEYNOTE OF

The Adjustaphone

Adaptable to any circuit.
Adaptable to any system.
Adaptable to any make of transmitter and receiver.
Adaptable to installation anywhere.



No. 1. Closed and swung out of Way



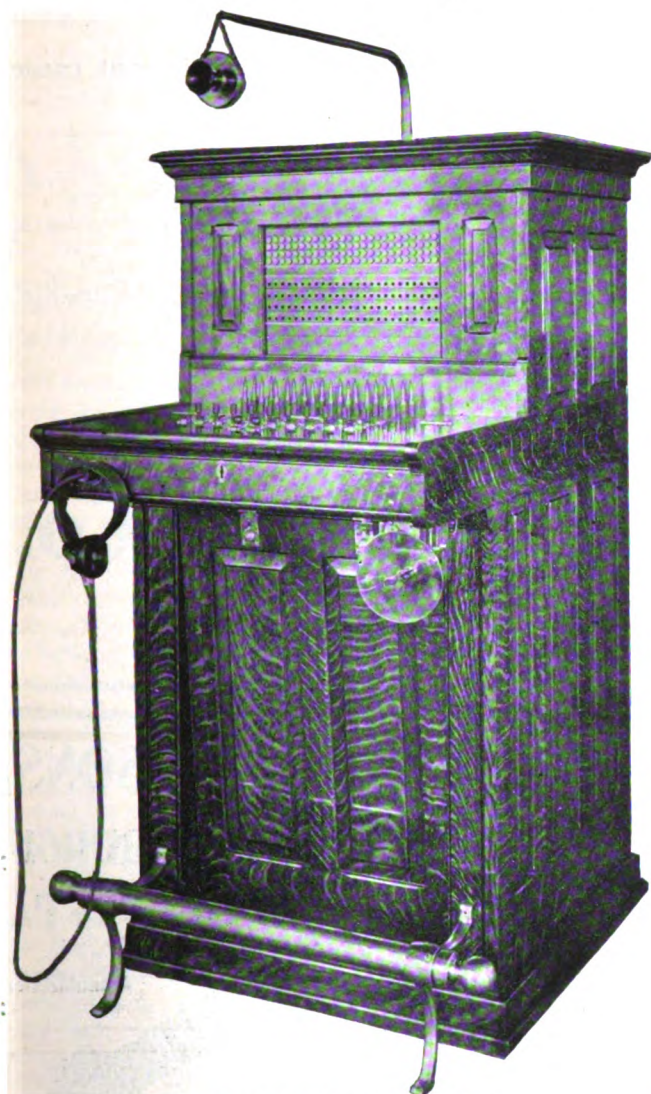
No. 6. Double Length for Flat Top Desk

Send for some on trial. If after trial you don't want them, they are ours, subject to return **at our expense.** Write us about this right now.

Remember the Adjustaphone cuts out that abnormal desk set maintenance cost.

Chicago Writing Machine Co.
105 WENDELL STREET, CHICAGO

OUR MOTTO
"Standards of Standards"
ALL WE ASK IS
A COMPARISON



100 LINE LAMP SIGNAL MAGNETO BOARD.

Our
LAMP SIGNAL
MAGNETO SWITCH BOARD

With all its latest improvements

Can Not Be Equalled

Write us for information.

Sterling Electric Co.
LAFAYETTE, IND.

**Take
A Drop**

Put a G. D. Extension Drop on one of your phones. Watch it work for a month. You'll want more of them. Send for sample and pamphlet D6.

**GARTON-DANIELS CO., Keokuk, Iowa**

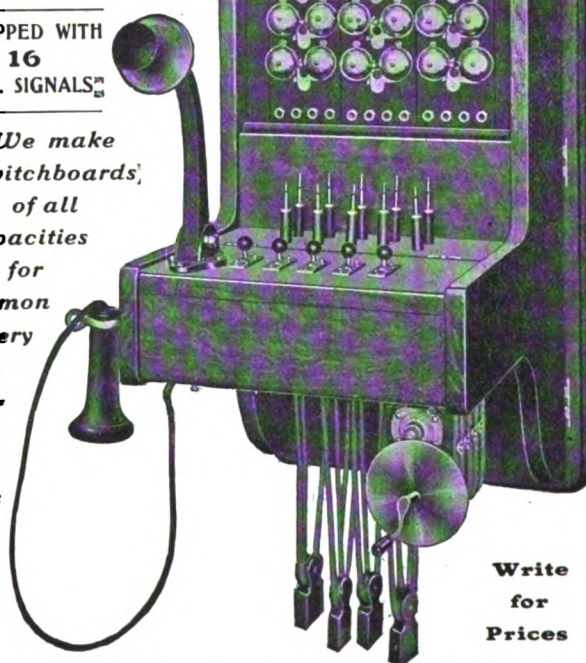
The Century

Type 6 A

**SWITCHBOARD
FOR
RURAL LINES**

EQUIPPED WITH
**16
 BELL SIGNALS**

*We make
 Switchboards,
 of all
 Capacities
 for
 Common
 Battery
 and
 Mag-
 neto
 Sys-
 tems*



Write
 for
 Prices

CENTURY TELEPHONE CONSTRUCTION COMPANY
536 Ellicott Square, BUFFALO, N. Y.

The Little Gem Grinder

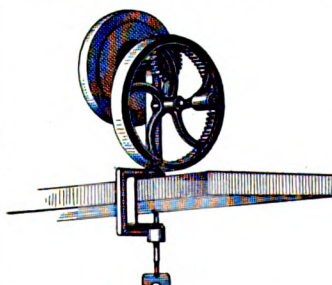
**A HANDY TOOL
 FOR EVERYBODY**

Has a 5x3-4 inch Emery Wheel.

A valuable adjunct to telephone exchanges, repair shops, butchers, restaurants, hotels, tinsmiths and plumbers.

Net Price, \$2.25

Liberal Discount to Agents.



A. C. SCRIBNER, Manufacturer,
GLOVERSVILLE, NEW YORK.

In the Life of a Telephone Lies the **PROFIT THEREOF**

How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO

Rot-Proof Crossarms

and Pins that don't come off or drop out

COST NO MORE

than ordinary painted Arms and Pins and save so much trouble and expense.

For particulars address

BRUNO GROSCHÉ & CO.

27 William St., New York

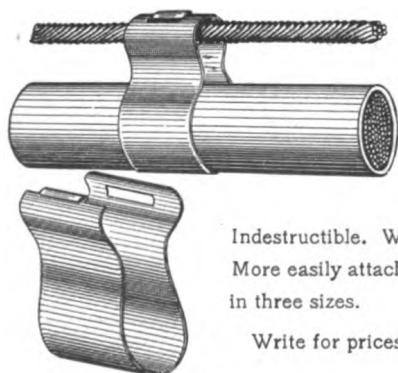


M. LANZ & SONS,
PITTSBURGH,
PA.

PLAIN
AND
GALVANIZED

Manufacturers of

**Telephone and
Telegraph Line Material**



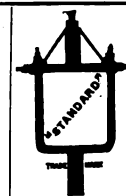
The Pittsburgh Cable Clip

Indestructible. Will not slip on or cut cable.
More easily attached than any other. Made
in three sizes.

Write for prices and particulars.

BULLARD & McELLIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.

Telephone Wire



and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insu-
lated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JUNE 4, 1904

NUMBER 23

THE JANUS TELEPHONE SYSTEM

By DR. A. GRADENWITZ.

A TELEPHONE system, known as the "Janus," has been exploited in Germany with a great deal of success. This system possesses some points which may be interesting and possibly profitable to American telephonists. The object of

the invention is to provide a method whereby two telephone systems which normally are independent of each other, such as an intercommunicating system and a private branch exchange, may be interconnected in such a manner that subscribers of either can hold communication with those of the other. The general arrangement of the circuits is shown in Fig. 2, in which the lines marked rab and zab comprise the circuits of one telephone system, while the lines marked rab, zab, zab are the circuits of the other system. Both sets of circuits enter the switchboard, as is shown in the diagram, and contain sets of keys: A, B, C, D, E, F, whereby, as is evident from the diagram, one set of lines may be connected or disconnected at pleasure from the other. By this arrangement it is easy to see that subscribers who

are attached to the circuits rab and zab can signal their own exchange and talk with each other, or by request may be put into communication with subscribers upon the other set of circuits and converse. Evidently an arrangement of this kind would be quite advantageous if employed in connection with private branch

exchanges, where any one set of subscribers desires frequently to communicate among themselves and occasionally with another set.

The apparatus which is employed in the Janus system is illus-

trated in the following views: Fig. 1 is an elevation of the Janus switchboard. One set of lines terminates in the answering jacks and signals placed directly above the cord shelf, while the other set of lines are connected with the dials which appear over the top of the switchboard. By means of the cords and plugs, subscribers which terminate in the answering jacks are interconnected in the ordinary manner, while by the dials the stations of the intercommunicating system are interconnected. Just in front of the plugs, upon the cord shelf, appear the buttons of the special keys whereby subscribers of the two systems may be connected together.

Fig. 3 illustrates the type of desk set used in conjunction with this system. The design is particularly noticeable, as it differs from American practice

to a great extent. Fig. 4 gives a good idea of the Janus wall instrument, which is conceded to be one of the best in design and workmanship. It is evident that such a scheme would be of great advantage where an intercommunicating system is installed.

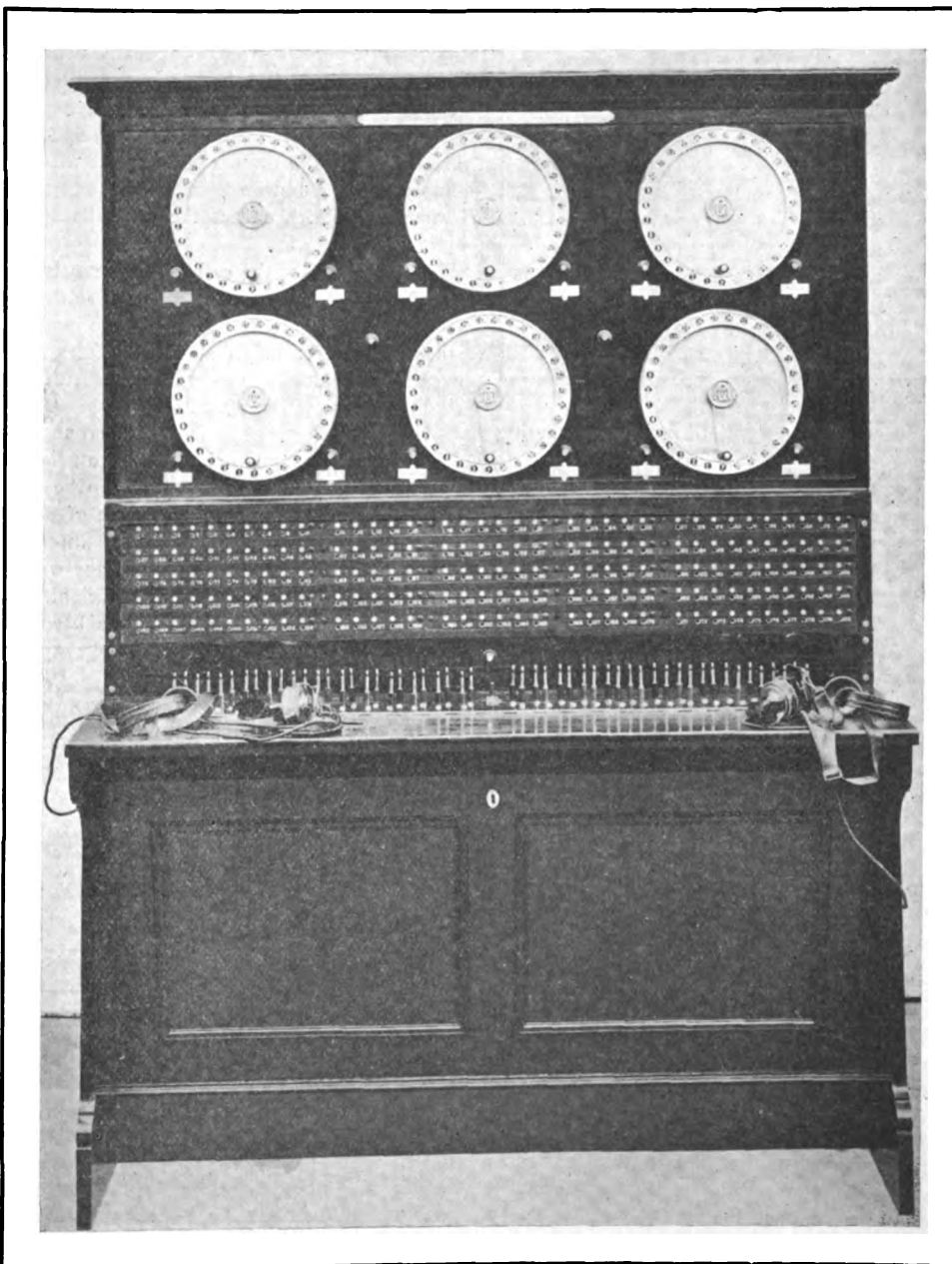


Fig. 1. Janus Interconnecting Switchboard.

CORPORATION TELEPHONES *

By A. R. BENNETT.

THE first Independent telephone exchange constructed by a corporation in Great Britain, was that of the States of Guernsey, which was established in July, 1898. From a small beginning it has developed until at the present time there are 1,230 telephones in the system. As the population is only 40,300, this makes an average of one telephone to every 33 people, and is consequently the best telephone area in the United Kingdom.

The second exchange to be established was that of the Corporation of Glasgow, which commenced operation in March, 1901. This has been a very successful system. Beginning with promises for 3,000 instruments, it now has 11,200, with a steady stream of new orders always on hand. The last published accounts showed

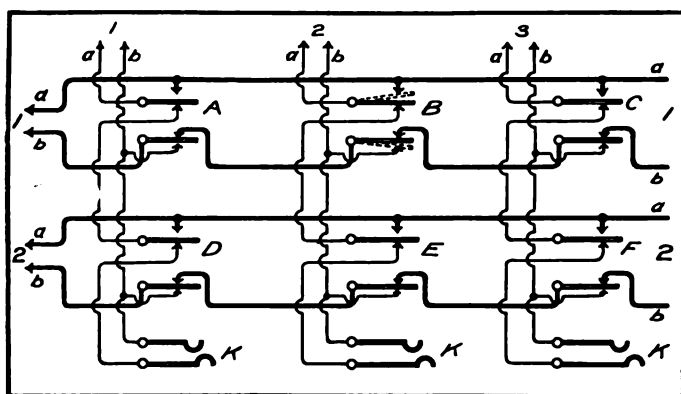


Fig. 2. Circuit of Janus System.

a surplus of over 10,000, after allowing for interesting and sinking fund.

The third corporation exchange was that of Tunbridge Wells. Originally only 300 lines were provided for, but the success of the service was so great that the full complement of lines were working within a few weeks of the opening, and in the course of a few months the number had increased to over 900.

Portsmouth followed with a municipal exchange, which was opened in March, 1903. At present there are 1,700 telephones in operation, and new subscribers are coming in daily.

The Corporation of Swansea next took up the question of municipal telephony, and opened an exchange in August, 1903. At present there are nearly 800 telephones in operation, and this exchange, too, is rapidly being filled to its full working capacity.

The sixth exchange was that of the Corporation of Brighton, which started business in November, 1903, having at present 900 instruments in operation and about 1,000 additional ones being connected as soon as possible.

In Portsmouth and Swansea the schemes were carried out well within the original estimates. In Glasgow this is also substantially true, although the fact has been veiled by alterations of and additions to the original plans.

Having made you acquainted with the present conditions of municipal telephony, I shall proceed to touch upon the manner in which the exchanges have been constructed. The system in Guernsey was at first almost exclusively aerial. The poles used were creosoted Norway fir. As the island is small and no chance existed of long distance trunk communications, it was decided to employ silicium bronze wire of an unusually small gauge; namely, No. 19. This wire has a breaking strain of 153 pounds and a resistance of 94 ohms per mile. The opinion at the time when the exchange was opened was that it would not stand the storms to which the island is subject and would soon be eaten away by the salt air. The opposite has been the case. The original, put up seven years ago, is still intact and shows little signs of wear.

With the increase of subscribers it was deemed advisable to lay underground cables, and this policy has been followed until the

mileage of underground wire is more than one-third that of the overhead, being, respectively, 318 underground and 827 aerial.

The switching system used in Guernsey is that known as the Bennett ring-through. It is so arranged that one subscriber can ring through to the other without making any signal at the exchange, the disconnection signal being unaffected until the proper movement is executed. The result is brought about by bridging the conductors in the connecting cords with two coils of equal resistance and taking off from between them a branch to ground through a battery. The ring off signal may either be worked by the resistance coils arranged as electro-magnets, or by a special indicator included in the battery circuit. This ring-through system has been adopted to a large extent on the Continent and in South Africa. I need scarcely mention that all lines in Guernsey are metallic. This applies to all corporation exchanges.

In Glasgow there are nineteen exchanges. In fourteen of these the ring-through system, practically the same as in Guernsey, is used, but in the remaining exchanges the all-wire system of operation is used. In three of these exchanges ring-off drops on the ring-through system have been installed, so as to render it unnecessary for subscribers to ring off after the connection. They simply press a button establishing a ground connection at their instrument, which causes the central ring-off battery to work the indicator.

The abolition of the call wire system is under consideration, but so far nothing to replace it has been settled upon. If the operators were provided with listening keys to enable them to ascertain the state of connection (a state of affairs which does not exist in exchanges belonging to corporations), the errors of subscribers in ringing off could be largely neutralized, but this expedient is so distasteful that it has so far not been adopted.

The construction work in Glasgow is to a very large extent underground, and is second only to the recently constructed post office system in London. The form of duct employed is cast iron socket-and-spigot pipes of 3 inches internal diameter, jointed by means of spun yard and lead, and are water and gas tight. Long routes where a single duct is sufficient, 3-inch stone-ware pipes with socket-and-spigot joints have been used, but these are of

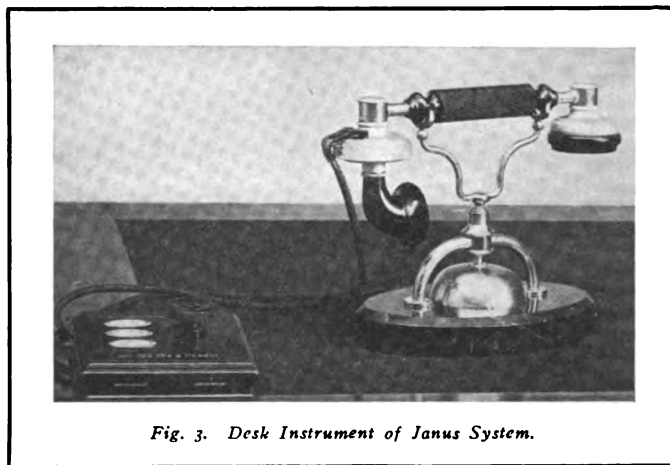


Fig. 3. Desk Instrument of Janus System.

very insignificant extent as compared with the mileage of iron pipes. Care has been taken to connect the iron pipes with the trolley rails at points where a difference of potential is found to exist, with the view of avoiding electrolysis. The use of iron pipes is in itself a safeguard to the cables, as any electrolytic action will first affect the iron pipe, and the lead sheath cable within will be protected until the pipe is eaten away. In the suburbs cast iron pillar boxes are used instead of manholes.

The cables used in Glasgow are of two kinds: armored and unarmored. They are all air-spaced, that is to say, the conductors are insulated by loose paper wrappings, the pairs being twisted together and laid spirally in layers, each successive layer being reversed. The size of the cables varies from 2 pairs to 312 pairs,

* Extracts from paper read at meeting of the Glasgow branch of the Institute of Electrical Engineers.

the last being contained in a diameter of 2.75 inches. The insulation resistance required at the factory is 7,500 megohms per mile, and insulation required after laying and splicing is 500 megohms. No. 22 conductors are used within a half mile radius of an exchange, and these give a capacity of .07 of a microfarad per mile. Beyond a half mile distance No. 20 conductors are used, and these give .08 of a microfarad. The cables in the manholes are fitted with nozzles through which air pressure can be applied. All splices are tested in this way before being passed as satisfactory, and they are also frequently subjected to air pressure tests. At the central exchange air pumps, driven by electric motors, are provided, by means of which air pressure can be applied at will to any of the cables, the air being first passed through drying pipes containing chloride of calcium. The air under pressure absorbs any moisture that may be present and discharges it at the opening, which is purposely made to allow its egress. If a puncture exists in a cable, the application of constant pressure prevents any moisture entering through the fault and so keeps the cable working under circumstances which, without air pressure, would speedily prove fatal.

In Glasgow, to a very large extent, underground cables are taken into subscribers' premises in the same way as gas and water. This is an expensive method, but is much freer from disturbances than the ordinary overhead wires. Away from the center of the city distribution is effected by means of a distributing pole or a roof fixture. No. 18 bronze wire is used for distributing purposes, weighing 40 pounds to the mile. It has a breaking strain of 200 pounds and a resistance of 45 ohms per mile. On trunk lines hard drawn copper wire, weighing 100 pounds to the mile, and a breaking strain of 330 pounds, is the standard. In the overhead distributing wires no twisting is employed. On trunk lines the circuits are transposed at intervals of a mile or less. The poles used for distributing are generally of creosoted wood, but sometimes they are of square pitch pine, and more rarely, steel tubes. The cross-arms are usually oak, but we have tried karri wood, which promises to be successful. In crossing trolley lines a cable is used which contains a stranded steel core, this being found sufficiently strong to support the span.

At the exchange the underground cables are first taken to a room fitted for air pressure tests, thence continued to the cross-connecting room, where they are distributed to the test jacks mounted on one side of an iron frame, to which they are permanently fixed. On the other side of the frame the lightning and high-tension protectors are mounted, to which the cables from the switchboard are connected, the test jacks and protectors being joined by jumper wires, which allow any alterations in the subscribers' numbers and prevents the cable wiring being distributed.

The switchboard at the Glasgow central exchange is designed for 10,000 lines, which at the present time are giving service to about 7,000 subscribers. The switchboard is flat, so that operators can sit on either side, an arrangement which saves a large amount of floor space. The jacks are two point with a third connection for test. The cords and plugs are hung from a canopy so as to leave a clear space for the operator's hands. The cords contain three conductors, two for the talking circuit and one for the test circuit. At the sections devoted to trunk line working the cords are single for the incoming trunk service. The outgoing trunk lines are distributed amongst the operators and are provided with listening keys, by means of which they ask connections from the various outlying exchanges. The operators' sets are of the pattern first made to my specifications for the Mutual Telephone Company at Manchester in 1891, and consist of a head receiver together with a breastplate transmitter. By moving the mouth-piece the operator is able to cut the speaking battery out of circuit when not required. This arrangement for hearing and talking

leaves both hands free to manipulate cords and keys. The same type of switchboard is used at five of the branch exchanges, but the boards differ from the central one in having ring-off indicators fixed to the canopies coinciding with the different pairs of cords. The subscribers' instruments are of the micro-telephone type. It has been found advisable to omit the finger key, which is a feature of these sets, owing to people not acquainted with telephone working failing to press the key. Every subscriber's station is furnished with lighting and high-tension protectors, the latest patterns of which are mounted on china.

The corporation has nearly 250 public stations, most of which are fitted with an automatic penny-in-the-slot machine. The signalling is accomplished by means of a contact arm divided into segments, which make contact with the coin and produce a number of makes and breaks in the operator's telephone. At the central exchange the pay stations are brought to a separate board, since the checking service is apt to interfere with the rapid work at the main board.

The Portsmouth Corporation telephone system differs little from the one in Glasgow, except as regards the switching system. The distributing poles are similar and the open wire distribution is effected with No. 18 bronze wire of the same specification as in Glasgow. Hard drawn copper wire is used for the local trunks, and Portsmouth possesses probably the longest trunk route in the

country, as in order to reach Gosport, which is only distant half a mile across the harbor, a circuit of twenty miles had to be made. This is owing to the inadaptability of the bottom of the harbor to submarine cables. The Portsmouth signalling system is the same as used in Guernsey and in the branch exchanges in Glasgow, except that the calling is done by means of a key at the sub-station, which when closed completes a battery circuit through ground and causes the subscriber's line signal to operate, being restored automatically by the operator upon inserting a plug. The wiring of the multiple jacks is somewhat of an innovation. The spring jacks consist of two pairs of springs, an inner pair and an outer pair. The outer pair of springs is in parallel with the subscriber's line and constitute the talking connection. The inner pair of springs of the several jacks are connected in series and the last springs grounded through the line signal and the operating battery. The insertion of a plug in any of the jacks connects the operator's set to the line and at the same time causes the inner pair of springs to open the signal circuit so that it is cut out.

This device saves the complexity usual in the American practice, where the signal is cut out of circuit by means of a relay in the test circuit.

The Swansea Corporation's telephone system is exactly the same as at Portsmouth, except that lamps are added to each operator's position, which indicate when an unusual flow of current is passing over the lines joined to that position. This enables any leakage on the outside lines to be speedily located. The signalling system is accomplished by lifting the receiver from the hook. This is effected by means of a passing contact attached to the hook, which momentarily grounds the subscriber's loop. The cord circuit is divided into two portions by means of a repeating coil, which insulates the one subscriber's line from the other and causes all speech exchanged between them to be effected by induction. A ring-off signal on the usual ring-through principle is bridged across the cord on each side of the repeating coil, one drop being colored red and the other yellow. When the called subscriber answers, the yellow drop falls, which is restored by the operator pushing a button. When the conversation is completed, both drops fall, giving the disconnection signal. The ring-through principle is maintained, so that if the called subscriber does not answer promptly, the caller, by turning the generator handle, can signal him as often as is necessary.

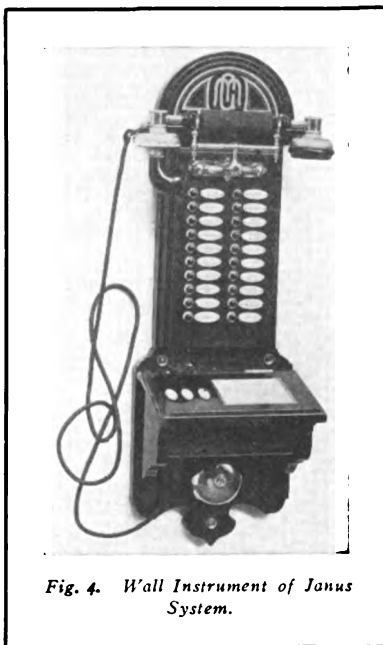


Fig. 4. Wall Instrument of Janus System.

HINTS ON THE CARE OF TELEPHONE STORAGE BATTERY PLANTS

ARTICLE I

By CHAS. D. SPENCER.

THE modern telephone exchange is becoming more and more a centralized power station, and those who have it in charge must become familiar with the operation of dynamos, motors and storage batteries, in order to successfully operate the apparatus. The tendency in telephonic practice is to centralize, so far as possible, all appliances at the exchange. This practice not only results in the direct saving of a large fraction of operating expense that heretofore was involved in the maintenance of local battery at subscribers' substations, but improves the service by making the current supply more uniform and reliable. Usually the power plant consists of a switchboard, to which the commercial circuits furnishing the electricity are brought, and from which the necessary wiring is extended to the dynamos and storage battery. The switchboard is equipped with voltmeters for measuring the pressure of the power circuit, of the charging circuits and of each individual cell. Ammeters are provided for giving records of the amount of current which is flowing in every circuit, and wattmeters are installed in order that the total quantity of energy purchased shall be recorded for proper charges. It is customary to design the power plant to comprise duplicate units of every important part. Usually commercial circuits are either 110 volt or 220 volt direct current or alternating current, which by means of a transformer may be delivered at any desired potential. As most telephone exchanges operate at about 24 volts, it is necessary to transform the current supplied by the commercial mains

to a direct current of from 24 to 30 volts to charge the batteries. This transformation is secured by either a motor-generator or a motor-dynamo, one side of which takes current as supplied by the municipal mains, while the other side always delivers a direct current at from 24 to 30 volts. In addition, the power plant must be supplied with the necessary ringing generators, so that usually there are four dynamos, and the switchboard must be supplied with appropriate switches for controlling all the circuits from each machine. From the battery, leads must be carried to appropriate buss bars located upon the power switchboard, from whence individual wires are carried to the telephone switchboard to distribute the battery to the repeating coils, operators' transmitters, signal lamps, etc. Fig. 1 is an illustration of a telephone power plant showing the salient features of the switchboard and dynamos upon their iron foundation, with the batteries in the foreground. Of all the portions of the power plant, the batteries are the most sensitive, the most likely to suffer from unskilled maintenance,

and, if neglected, to entail a large expense for renewal. So it is to direct special attention to this portion of the plant that the present paper is compiled. Each cell of battery consists of four parts; a jar or other receptacle, usually of glass, or wooden tank lined with lead, two sets of plates, respectively termed the positive and negative plates, which are placed in the jar, and surrounded with an electrolyte composed of dilute sulphuric acid. The plates are composed of slabs of lead containing perforations or indentations termed grids, the holes being filled with spongy lead in the negative plate, and peroxide of lead in the positive one. The difference between the two plates can readily be distinguished by the color of the material filling the grid. The positive plate is of a velvety brown chocolate color, while the lead sponge in the negative is light gray. Hardness is also an indication, for the positive coating is hard and brittle, like soapstone, while the negative plate is soft and can be easily indented by the thumb nail. Fig. 2 is an illustration of a group of cells of various sizes such as are commonly used in the telephone exchange. The most important point to be observed in the care of the battery plant is the proper regulation of the current used in charge and the demand during discharge. If batteries are crowded either by being charged or discharged at an abnormal or excessive rate, a disintegration of the material of which they are composed rapidly takes place. The plates buckle and the active material, being forced out of the grid, drops to the bottom of the jar, becoming not only useless from being separated from its proper environment, but is likely to pile up and by bridging the gap between the plates, short circuit them and causes the battery to discharge by local action. The first essential information regarding a battery plant is, therefore, to know the proper rate of charge and discharge. The tables 1 and 2, issued by The Electric Storage Battery Company, give the characteristics of the ordinary sizes of cells which telephone installations will be likely to employ. It is important that the attendant should never allow the rate of charge or discharge to exceed that which is given in the table, for the makers of storage batteries are, on the whole, prone to overrate the capacity of their product and to give charge and discharge currents which are much more likely to be too large rather than too small, so that it is conservative to provide a battery whose charge and discharge rate shall under all circumstances be well within the limits specified. The makers of storage batteries issue sets of instructions for the care and maintenance of cells, from

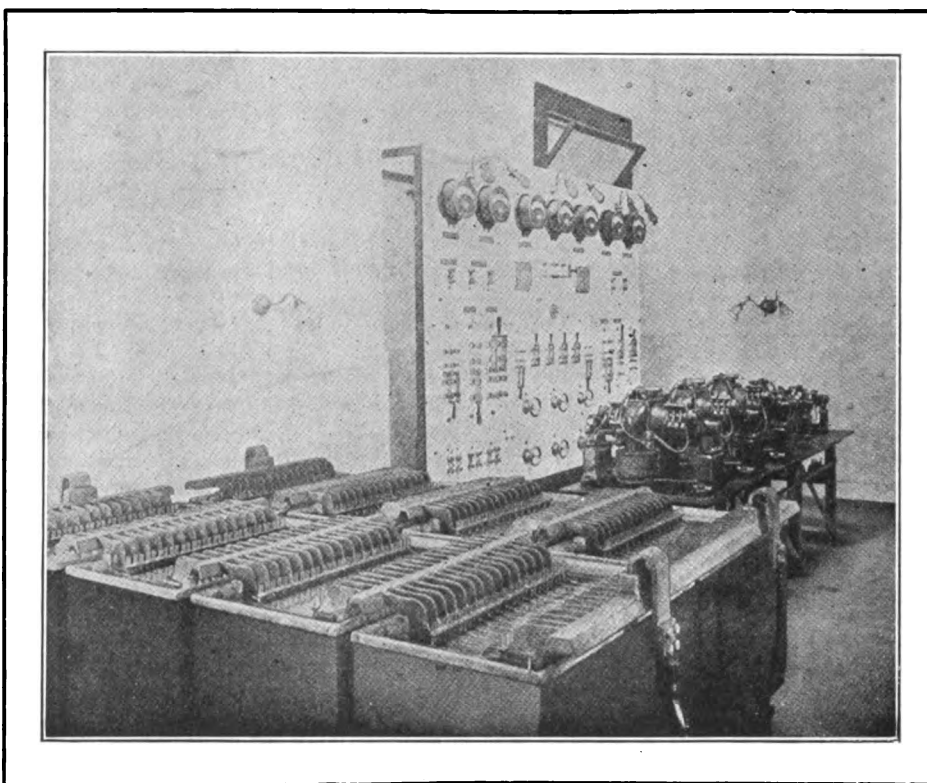


Fig. 1. Central Office Battery Plant.

(which the following are quoted,) as on the whole being representative of the widest and most authoritative experience. Storage batteries are usually shipped by packing the jars or tanks and plates, and other small parts, in separate boxes.

The packing-boxes should be opened on the side marked "up," and great care must be taken in unpacking, as neither the jars nor the plates will stand rough handling.

The jars must be lifted out of the boxes. Do not, after removing the cover, turn the box upside down and try to lift it away from the jars, as this experiment is almost certain to cause breakage.

Above all, do not give any of the packing-boxes an unnecessary shaking up in opening them.

The jars, no matter of what material they are made, must be carefully cleaned and examined to ascertain their condition. All cracked jars must be rejected, however slight the fault may appear. Glass jars often have slight ridges, due to an uneven flow of the material in moulding, which may easily be mistaken for cracks. These are not injurious. If jars of any material other than glass are used, it is well to fill them with water and allow them to stand for a time before putting them into service, in order that any break in the material may be detected.

The plates must be examined with care and the following points noted.

The plates may be bent. This sometimes occurs, from rough handling, and must be corrected.

If it is but slight it may be removed by hand without separating the plates, but if a number of the plates are badly bent the positive and negative elements must be pulled apart, an operation demanding considerable care, which must be accomplished in the following manner:

If the plate is provided with separators of hard rubber they must be removed before separating the plates, which then come away from each other easily. If asbestos or wood separators are used instead the elements must be loosened; then remove the wood, which will leave the elements in a condition to be easily taken apart. After removing the negative element from the positive element, take the asbestos cloth from the positive plates with care.

Having separated the two elements, straighten the plates by placing flat boards of the proper thickness between them and applying pressure; not a series of blows, but slowly and continuous, applied by means of a suitable lever or screw-press.

In the case of a pasted plate, one or more of the squares of paste may be cracked or loosened. If so, remove all such squares with a pointed instrument. If a cracked or loosened square is allowed to remain in the grid it will cause trouble by falling out and short-circuiting the plates.

The plates may be dusty. Blow through them with a small hand bellows to remove dust, and if any scale is noticed on the

surface, be sure to scrape it off with a great deal of care.

The separators may be out of place. If hard rubber or glass-rod separators are used it is of the greatest importance that they stand vertically, and hence each set must be inspected with special reference to this, the pins or rods being straightened if necessary, and placed so that they stand in true lines bearing upon each plate at points exactly opposite, otherwise the pressure of the binding rings may bend the plates. The lugs must be scraped bright for at least one inch on each side of the hole through which the connecting bolt passes. Do not try to scrape the lugs with a small knife blade, or with any thin-edged tool, which will simply chatter over the surface and make a lot of irregular grooves, but procure a good stiff plumber's scraper and remove the surface of the lead uniformly, so that the lugs when clamped together will bear evenly against each other.

The plates may be short-circuited. It sometimes happens that a piece of solder or a shaving from the lead lug may fall in between the plates. As the existence of such a fault would probably ruin the cell, the greatest care should be used to remove

such defects. Much time may be saved by testing each set with a magneto and bell, or with a few cells of battery and a suitable detector before placing them in the jars.

The shelving upon which the accumulators are to be placed should be of well-seasoned wood, and the frames upon which they rest should be securely put together. The shelving and frames should receive at least two (preferably three) coats of either creosote paint, black asphaltum or shellac varnish and the legs of the supporting frames should rest on porcelain blocks or other insulators, thereby raising

them two (2) inches or more from the surface of the floor. When the floor space is available it is well to place the accumulators upon long tables, in order that they may be readily accessible. When shelving must be used, experience has shown that to secure the best results the cells should not be more than three rows high for small or medium-sized ones, and not over one row high for large cells.

When glass jars are used they should rest upon a wooden tray, covered with sand or sawdust, supported by four (4) oil insulators, which rest upon the shelving. These trays must be of well-seasoned wood, thoroughly painted or varnished. In all cases, excepting where hard rubber jars are used, the cells should be supported upon insulators of the mushroom pattern.

Each element consists of an odd number of plates, and that set consisting of a less number of plates than the other is known as the positive. This is the set by which the current enters during the operation of charging; the other element, containing the greater number of plates and which always included the two outside plates, is known as the negative.

The negative plates are of a grayish color, and the positives

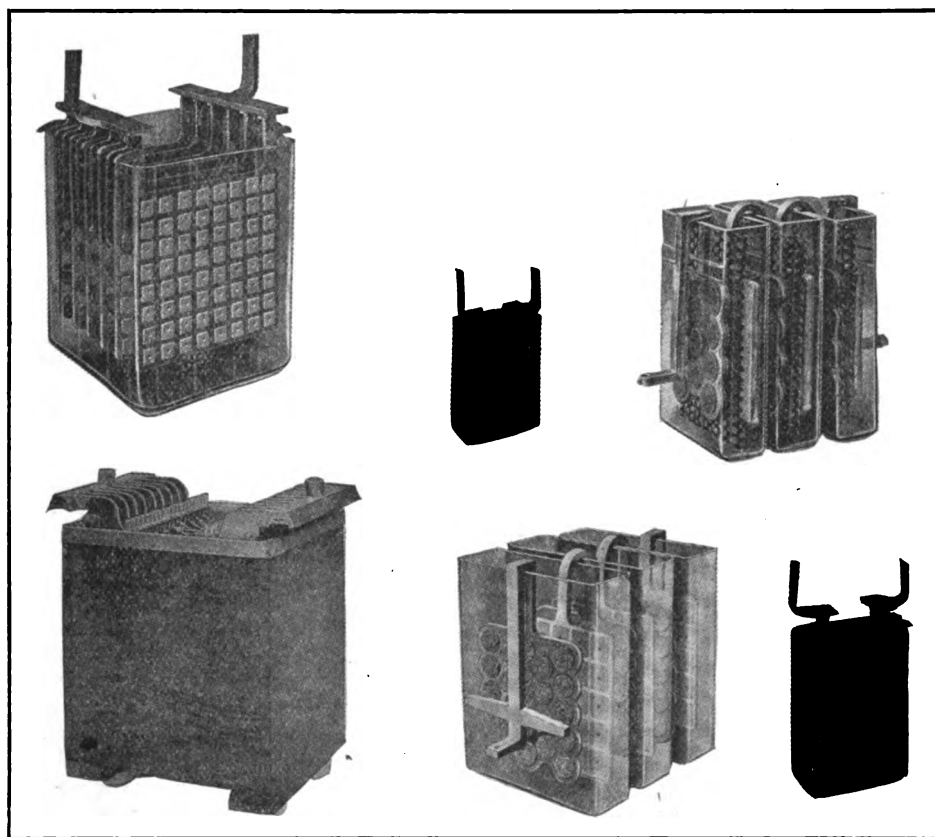


Fig. 2. Types of Cells Used for Central Energy Telephone Systems.

are light brown. In connecting a single series of cells the positive pole of each cell must be connected to the negative pole of the next cell in the series. The free pole at one end of the series will, in consequence, be a positive terminal and a negative at the other.

The cells should only be arranged in double rows, when they are accessible from each side.

Number of Plates		5	7	9	11	13	15
Discharge in Amperes	For: 8 hours . .	10	15	20	25	30	35
	5 "	14	21	28	35	42	49
	3 "	20	30	40	50	60	70
	1 "	40	60	80	100	120	140

Normal charge rate	10	15	20	25	30	35
----------------------------	----	----	----	----	----	----

Outside measurement of glass jar, in inches	Width . .	5 1/4	6 3/4	8	8 3/4	11	11
	Length . .	9 1/8	9 3/8	9 3/8	9 3/8	9 3/8	9 3/8
	Height . .	11 3/8	11 3/8	11 3/8	11 3/8	11 3/8	11 3/8

Outside measurement of rubber jar, in inches:	Width . .	2 7/8	3 3/8	5	6 3/8	8 3/8	8 1/2
	Length . .	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2
	Height . .	11	11	11	11	11	11

Outside measurement of all metal t's, in ins.:	Width . .	8 3/4	9 3/4	11 3/8	12 3/8	13 3/4	15 1/8
	Length . .	11	11	11	11	11	11
	Height . .	12 1/4	12 1/4	12 1/4	12 1/4	12 1/4	12 1/4

Weight of acid, in pounds:	In Glass . .	18 1/2	20	24 1/2	26	35	34
	" Rubber . .	5 1/2	8	10 1/2	12	17	18 1/2
	" All metal Tanks . .	27 1/2	31 1/2	36	40	44 1/2	49

Weight of cell complete, with acid, in pounds:	In Glass . .	49	60 1/4	75	88	106	115
	" Rubber . .	29 3/4	41	53	64	79	89
	" All metal Tanks . .	85	105	125	138	163	183

Height of cell to top of lug, in ins.:	In Glass . .	20	20	20	20	20	20
	" Rubber . .	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2
	" All metal Tanks . .	16	16	16	16	16	16

Table 1. Elements of Type "E" Cells.

Before placing the plates in their jars the terminals should be scraped, then proceed as follows:

Place the insulating tray on a table of convenient height and fill with clean, fine sawdust or sand, to make a soft bed. Place the jar on this tray, taking care to have it well cleaned.

Place the bottom block in the jar, unless the jar is provided with a special base rendering this unnecessary, in such a position

that the heavy bars stand at right angles to the proposed position of the plates.

Having placed the plates properly in the jar, take hold of the tray and lift it into its position on the insulators, previously placed on the shelf.

A space of about an inch should be left between each cell.

The nuts on the connecting bolts must be screwed firmly into place until the washers cut into the lead slightly. Do not strip the thread or break the bolt.

After the connections are completed, give each a coat of cosmoline (thick), which prolongs life by preventing corrosion.

It is general practice with large cells to burn the positive ele-

Number of Plates	9	11	13	15	17	19	21	23	25	27	
Discharge in Amperes	For: 8 hours, . .	40	50	60	70	80	90	100	110	120	130
	5 "	56	70	84	98	112	126	140	154	168	182
	3 "	80	100	120	140	160	180	200	220	240	260
	1 "	160	200	240	280	320	360	400	440	480	520
Normal charge rate	40	50	60	70	80	90	100	110	120	130	

Outside measurements of glass jar, in inches:	Width, . .	9	10 1/8	10 3/8	12						
	Length, . .	12 1/8	12 3/8	12 5/8	12 3/4						
	Height, . .	15 1/8	15 3/8	15 5/8	15 3/4						

Clearance between jars 1 1/2 inches.

Outside measurements of all metal tanks, in inches:	Width, . .	13 1/8	14 1/8	16 1/8	18 1/8	19 3/8	21 3/8	23 3/8	24 3/8	26 3/8	28 3/8
	Length, . .	14 1/8	14 3/8	14 5/8	14 3/4	14 1/2	14 3/4	14 1/2	14 3/4	14 1/2	14 3/4
	Height, . .	15 1/8	15 3/8	15 5/8	15 3/4	15 1/2	15 3/4	15 1/2	15 3/4	15 1/2	15 3/4

Clearance between metal tanks 2 1/2 inches.

Outside measurements of lead lined wooden t's in inches:	Width, . .	13 1/8	15 1/8	16 1/8	18 1/8	20	21 3/8	23 3/8	25	26 3/8	28 3/8
	Length, . .	15	15	15	15	15	15	15	15	15	15
	Height, . .	20 1/8	20 3/8	20 5/8	20 3/4	20 1/2	20 3/4	20 1/2	20 3/4	20 1/2	20 3/4

Clearance between wooden tanks 2 inches.

Weight of acid, in pounds:	In glass jars, . .	56	61	59	70						
	In all metal tanks, . .	78	88	98	108	117	128	138	147	157	168
	In wooden tanks, . .	86	99	111	123	133	145	156	168	180	191

Weight of cell complete, with acid, . .	In glass jars, . .	163	190	210	246						
	In all metal tanks, . .	239	278	315	352	391	430	467	504	542	581
	In wooden tanks, . .	250	292	332	372	411	452	492	532	573	615

Height of cell to top of lug, in ins.:	In glass jars, . .	26	26	26	26						
	In all metal tanks, . .	20 1/8	20 3/8	20 5/8	20 3/4	20 1/2	20 3/4	20 1/2	20 3/4	20 1/2	20 3/4
	In wooden tanks, . .	24 1/8	24 3/8	24 5/8	24 3/4	24 1/2	24 3/4	24 1/2	24 3/4	24 1/2	24 3/4

Table 2. Elements of Type "F" Cells.

ment of one cell and the negative element of the adjoining cell to a common bus bar after they have been placed in position.

When the connecting lugs of the cells are provided with screw-lugs, the threads of the lugs should be coated with cosmoline and plumbago, before the lead nut is screwed in place, thereby preventing the nut from sticking. Should a nut stick, do not force it, but remove the nut and use the forming tool or die on the screw-lug. The trouble may also be in the nut, in which case it must be tapped with the tool provided for that purpose.

It is very easy to drop a nut or a washer into a cell and not at all easy to get it out. It is also very easy to hit the glass jar with a wrench and break it. Therefore, it is well to cover the cells while connecting and to use the greatest care.

(To be continued.)

AN ELECTRIC SOLDERING IRON CORD REEL

By OTIS J. DORWIN.

IN many exchanges it is desirable to use an electric soldering iron in place of the ordinary iron if there is an all-day lighting circuit or a storage battery available for current. If the gas rates are high and the company operating a central energy plant gets power for its charging machine on a flat-rate basis there would be no cost whatever for heating the iron as the charging machine can be run a few minutes longer than usual each day to make up for the energy used by the iron. Even where the above conditions do not exist an electric soldering iron will commend itself on account of its electrical efficiency (one consumes a little less current while heated than two sixteen-candle-power incandescent lamps) and its labor-saving qualities, resulting from its constant, even temperature.

The great disadvantage in using the electric iron is the handling of the usual extension cord and plug. The frequent changing of the extension cord and plug from one socket to another suggested the following described reel, which takes up the cord when not in use, and also does away with the transferring of the cord and plug.

The device should be placed in the center of the soldering district, or to state it more clearly, it is to be placed midway between the extreme points where the soldering iron is ever used. The reel has two drums, one for taking up the soldering iron cord and the other to wind up a rope attached to a counterweight, which runs through pulleys on the ceiling. When the iron is not in use and the reel has wound up all of the cord, then the weight is

down, but as the cord is drawn off the reel the weight rises. A ratchet and notched wheel placed between the two reels prevents the device from taking up the cord except when desired.

The first things required to make the contrivance are two empty wire reels, such as *A* in Fig. 1. One reel should be large, preferably 9 inches in diameter and 5.5 inches long, while the other may be smaller, 6 by 4 inches in size. Next find out what the length

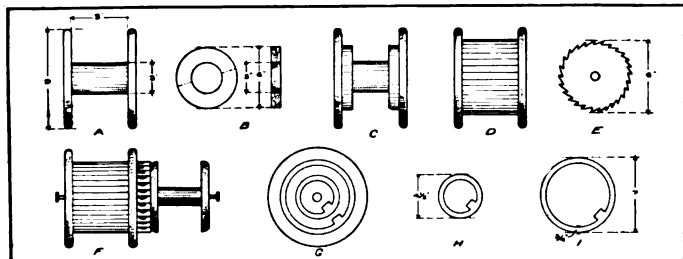


Fig. 1.

of the cord for the iron must be to reach anywhere in the exchange from the reel, and also determine through what distance the weight can be allowed to play. It may be convenient to let the weight run up and down in a corner of the room, perhaps behind a door. If this can be done, then the height of the room, minus 1 foot, may be taken as the distance through which the weight can play. Now if the ceiling is 11 feet above the floor and the soldering iron cord is to be 40 feet long, the diameter of the large or take-up reel must be four times that of the small reel, which winds up the cord attached to the weight. The dimensions given in the drawings are suitable for these cord lengths, and in fact would probably take up a soldering iron cord 50 feet long, owing to the fact that as the cord winds one layer on the other it increases the winding circumference of the drum.

Having determined what the diameter of the large drum must be, the next thing is to take a piece of clear, straight-grained pine, about 3 inches thick, and with a keyhole saw cut out carefully two circular pieces, like that shown at *B*. The outside diameter to be 6 inches and the inside diameter 3 inches. Draw a penknife across each piece where the dotted lines are shown and then split them at this place. Now slip them together on the large spool, as shown at *C*, and tack with small brads. Get a cigar box and saw strips across the grain of a width to fit snugly in between the ends of the large spool, and then with a penknife split this into narrow strips about a quarter of an inch wide. Tack these small pieces around the spool on the circular pieces of pine, so that when finished the spool will look as shown at *D*. This done, get a piece of some hard wood if possible; if not, pine will do, and cut out with the keyhole saw the ratchet wheel, shown in *E*. This should be about 6 inches in diameter and have teeth like a saw.

When this is finished, get a piece of pine and whittle out a round stick, just large enough to enable it to be driven tightly into the holes in the two spools, and also through a hole which must be bored in the ratchet wheel. After the spools with the ratchet wheel between them have been driven on the stick, the ends must be sawed off flush with the end of the spools. Now find the exact

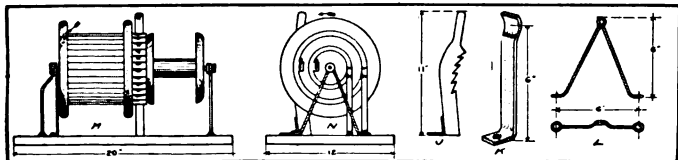


Fig. 2.

center of each end of the stick and with a 3-16-inch drill make a hole straight down into it. Drive two wire nails, large enough to fit very tightly, into the holes. This brings the device to the stage illustrated at *F*.

From a sheet of tin cut out two circular pieces like those pictured at *G* and *H*. The smaller one to be 4.5 inches in outside diameter and the larger to be 7 inches. A small projection or lip should be left on the inner circumference of each tin ring so that the ends of the soldering iron cord may be soldered to the rings at these points. After the rings have been cut out they should be

flattened. Then holes can be punched at stated intervals around the ring so that it can be tacked to the end of the large spool with small brads. Care should be taken to prevent the rings from bulging up when tacked down. With the rings in place the end of the spool looks like *I* in Fig. 1.

A ratchet, shaped like *J* in Fig. 2, is to be made next. The same wood used for the ratchet wheel will be most suitable for the ratchet. A hinge is to be used to fasten the ratchet to the base or back board of the reel. *K* shows a brush or contact strip, two of which are to be made from spring brass or copper. These contact strips are bent, as shown in the drawing, so that they can be screwed to the back board in a position to rest, each on one of the rings of tin. *L* and *M* show how they are to be placed.

Now get about 4 feet of No. 6 or 8 iron wire, and by heating it at the points where it must be bent, shape it into two objects like those pictured at *N*. These are to act as the bearing brackets for the reel. It might be well to delay driving the two large nails in the reel, as described above, until after these wire brackets are bent so that the nails may be placed in their holes in these brackets before being driven home. About three turns should be made at the point where the nail turns in order to give more bearing surface. *O* is a bottom view and *P* an end view of the reel.

After these parts have been made they can be assembled and the

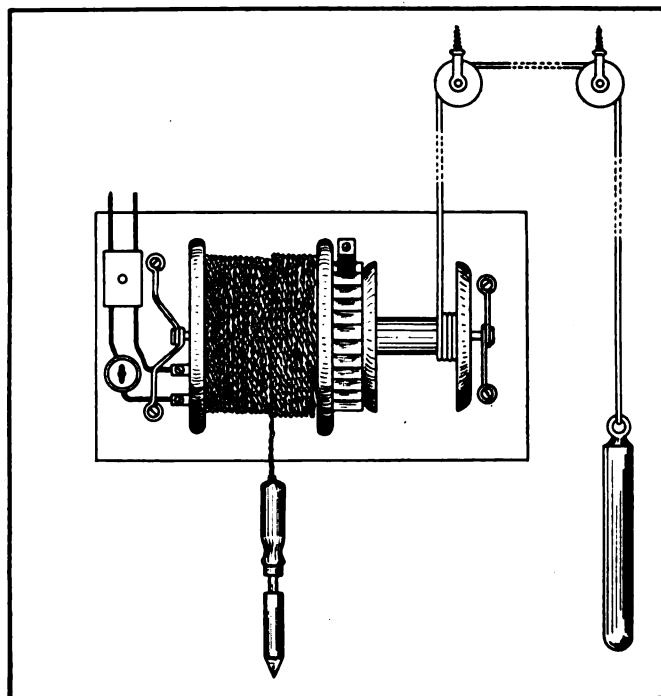


Fig. 3.

whole screwed to a back board 20 by 12 inches in size. The reel, in winding up the cord, should turn as indicated by the arrow at *D*, and the ratchet wheel must of course have its teeth pointing in the direction opposite to that shown at *E*—that is, when it is placed between the two reels it must be turned with the other side next to the large reel.

Two holes should now be drilled through the end of the large spool, at the place indicated by the dotted lines at the arrow at *L*. The holes should be drilled at a point near the tin projections on the inner side of the tin rings. They are for the ends of the soldering iron cord. The cord, which may be ordinary twisted lamp cord, is untwisted for 2 or 3 inches and placed in the holes, after which the ends are soldered to the tin projections. Now after drilling a similar hole through the end of the small spool for the weight rope, pass the weight through and tie a knot on the outside to prevent its slipping back. This will fasten the rope to the spool securely. Place two or more pulleys on the ceiling, through which run the rope, and tie the weight, which may be the kind used in window casings, to the other end.

All that now remains to be done is to screw a fuse block and a snap switch on the back board and connect the wires, as shown in Fig. 3.



A MARVELOUS BELL IDEA.

THE AMERICAN TELEPHONE JOURNAL has not found occasion in times past to say much in commendation of the Bell telephone monopoly or any of its creatures. There has been neither the disposition nor the opportunity. The conduct of this aggregation of organized selfishness, which under differing names, but always with the Bell earmarks, operates in various parts of the country, has not been encouraging to enthusiastic adulation. Yet even the Bell monopoly occasionally breaks out in a new spot, in a manner which excites admiration, if not esteem.

A case in point is the recent action of the Rocky Mountain Bell Telephone Company. In accordance with the usual custom where an Independent company is being established, its patrons who are also subscribers to the Bell service were offered the same telephone number as that to which they have become accustomed. This was the first serious opposition to the Bell concern which had appeared in this district, and the occasion demanded vigorous measures. Whereupon the Bell company launched a remarkable manifesto, of which the following is the concluding paragraph:

"This is our answer: We have tried to serve you in the past and feel that we can do better in the future. Two telephones are a nuisance and will cost you more money than one; our advice is to wait and see whether the 'pig in the poke' is worth buying. We most decidedly object to the use of our telephone numbers by the Utah Independent Telephone Company, or by any other company. *Our telephone numbers are all copyrighted, and the property of this company, and will be protected.*"

With all their astuteness, and they have shown themselves capable of dealing with every imaginable condition, the Independent operators would never have thought of this. Copyrighting the numerals is a stroke of aggressive business policy which dazzles the imagination. We cannot help admiring the gigantic brain which conceived so stupendous a proposition, even though it be the brain of a soulless monopoly like the Bell. Let the idea be properly wrought out and capitalized, and even the Bell octopus would pale into insignificance; its watered stock, which has been so badly squeezed during late years, would not be a drop in the bucket, so to speak.

Our ancestors always counted on their fingers; consequently to-day we count by tens. So used, the fingers are really numerals; that is, visible numerical signs. Why not copyright those? The suggestion is given merely for what it is worth. It may appeal to the Bell sense of right and justice.

Then, again, the old Romans kept count of the years by yearly driving a nail into the temple of Minerva. This was before the age of telephones; yet it is difficult to understand how the Bell people have happened to overlook so important a matter. A copyright on nails as a business proposition would make a telephone monopoly look like "thirty cents."

To contemplate these things and the possibilities growing out of them almost stuns the mind. Why not copyright the alphabet and thus at one fell swoop impose a tax, not only on freedom of speech, but on all human knowledge? Now, here is an idea,

WHY NOT COPYRIGHT BREATHING?

worthy of even Bell parentage, and we are not charging a cent for it. This copyrighting of certain numerals merely inconveniences the Independent company and its patrons. They would

prefer to use the same combination of numerals that has become associated with the individual or firm employing the service. But there are other combinations that can be used. The case of the alphabet is different. Let the Bell people once copyright the twenty-six letters of the alphabet, the Independent companies would have to go out of business, because they could no longer print the names and addresses of their patrons.

What a weight that would lift from the minds of the Bell financiers, if by so simple a thing as a copyright they could shut out all competition and once more get their avaricious fingers on the throat of the public. Paying dividends on watered stock and liquidating its enormous bonded indebtedness would then be easy. Get absolute control of a public necessity and charge the people all they will stand—that is the way to pay dividends, whether you are dealing in anthracite or telephone service.

These arrogant monopolists would tax the very air we breathe and copyright the circulation of the blood, if only the people would stand it. The telephone to-day is practically a necessity. The commercial world has become so adjusted to the telephone standard of communication, that the loss of the telephone would involve great shrinkage. Yet, it is not so great a necessity that the people will not rise up occasionally and administer a deserved rebuke. "If the people will stand it"; there is the rub. Thanks to Independent competition and its educative influence, the people will no longer endure extortion for any length of time, and no longer have to, except in isolated cases.

The East Tennessee Telephone Company, a branch of the Cumberland, which has been receiving so much unpleasant notoriety of late, recently notified its patrons at Stanford that the rates for telephone service would be increased, beginning with June 1st. The telephone, after all, is not quite a necessity. A mass meeting of citizens was held and every telephone was ordered out. The following week the local manager received an order from the Nashville headquarters to continue the old rates.

The pathway of the Bell monopoly seems to be strewn with thorns, whether it be in Utah or Tennessee, or some other place. Down in North Carolina there is trouble. The rates at Asheville were advanced and the *Citizen* is loud in its denunciation of the extortion and the wretched service.

"The people have rights," says the *Citizen*, "and there is a limit always to imposition, whether it be by an individual or a corporation. Unless we are mistaken, when the thirty-three-year franchise was granted, one of its sections specifically called for a first-class service in every respect. Having failed to comply with this requirement, the company should be compelled to show cause or forfeit its franchise. 'It's a long lane which has no turning,' and we believe that as far as the Bell company is concerned it has come to the turning."

Our Bell friends ought to get out a copyright on that franchise or there will be trouble.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

FRANCHISE TO DE FACTO CORPORATION.

Before our company was fully organized, that is, before we had filed our articles of incorporation with the Secretary of State, our franchise was granted. Some parties, who wished to get a franchise for themselves, say our franchise is not any good. We were all ready to file our articles, which were drawn up and signed, but we did not mail them to the secretary until the next morning after the council acted. Please advise us whether our franchise is really good or not.

K. T.

IF there is no question as to your company being the corporation for which the franchise was intended, the validity of the franchise cannot be questioned on the ground you state. You were a corporation *de facto* if not *de jure* at the time the franchise was granted. If you accepted or acted in reliance upon the franchise, there is no doubt as to its validity. See *Domestic Telephone & Telegraph Company vs. Citizens' Telephone Company*, 9 N. J. L. J. 210.

LOCATION OF POLES MUST BE REASONABLE.

Our company is incorporated in Ohio. Under the law we are required to so locate our poles in the public highway as not to incommode the public. The highway commissioner of one township objects to our setting the poles where we propose, and says we must set them back against the fence. We wish to set them about six feet from the beaten roadway, but just beyond the ditch, which is very shallow. What is the rule as to where we must put them?

L. N.

YOU are required to exercise only reasonable care in the location of poles, so as not to incommode public travel, but you are not required to so locate them as to provide against all possible injuries. *Sheffield vs. Central Union Telephone Company*, 36 Fed. 164. I therefore think the location you propose a reasonable one, so far as you state the facts.

ESTOPPEL TO QUESTION AUTHORITY.

EDWARD WHITE and others, copartners under the name of the Fairview-London Telephone Circuit, petitioned the village of London Mills, Ill., for permission to use the streets of the village for the erection of a telephone circuit. The petition was granted by a resolution. Subsequently a corporation, known as the London Power & Electric Company, was given permission by ordinance to transact a telephone business in the village. It was provided that the privileges granted the latter company should be exclusive and irrevocable for twenty-five years. All previous ordinances, grants or permissions in conflict therewith were repealed with the proviso that lines already established should not be changed for six months. A majority of the village board were stockholders in the latter corporation. After a futile attempt to force the Fairview-London Telephone circuit to connect with the London Power & Electric Company's circuit, an ordinance was passed specifically naming the former company and revoking its rights and privileges, but providing that its plant might be used until September 2, 1901. That date passed without action. On November 7 a notice was served on the Fairview-London Telephone Circuit, giving it thirty days to remove its poles, wires and fixtures from the street. The Fairview-London Circuit then brought suit, setting up the foregoing facts, alleging a conspiracy between the village authorities and the London Power & Electric Company, and asking an injunction to restrain the threatened removal. The bill alleged that the ordinances mentioned were against public policy and void.

After a decree for complainants in the circuit and appellate courts (105 Ill. App. 146) the case reached the Supreme Court of Illinois. The defendants contended that the permission originally granted the complainants was without effect because not granted by formal ordinance. The complainants' position was that the license granted them had become a contract and was irrevocable. Said the court, "We therefore hold that where a village board

has, by resolution, granted to the owner of a telephone line the use of its streets and alleys, in which to set poles and to string wires for telephone uses, and where the licensee, with the knowledge and tacit consent of the village authorities, has accepted and acted upon such resolutions by erecting poles and stringing wires in the streets and alleys, the license so granted thereby becomes a contract, which is valid and binding upon the parties thereto, and which cannot be revoked by the village. Equity and good conscience require that the village of London Mills be not now heard to say that this written consent must in the first instance have been given by ordinance. It is now equitably estopped so to do." The court also overruled objections to the bill on the grounds of multifariousness and misjoinder. The opinion was by Mr. Justice Scott. Mr. Justice Magruder concurred specially. He held that had there been no subsequent ordinance recognizing the existence of the rights granted by resolution the latter would have been insufficient to grant the right. He considered the doctrine that the use of streets can be granted by mere resolution unfortunate from the fact that resolutions do not need to be submitted to the mayor for approval.

An application for rehearing was denied, the court holding not well taken the point upon which it was based, that a natural person cannot be granted the right to maintain a telephone line in the streets of a city or village. *Village of London Mills v. White* (Ill.), 70 N. E. 313.

FRANCHISE EXTENDS TO ANNEXED TERRITORY.

IN an opinion given recently by Judge Mack in the Circuit Court of Cook County Ill. the Chicago Telephone Company was dealt a severe blow as to its contention that the terms of its original grant do not apply to the territory annexed to the city since 1889. The decision was in the case of the Alton Grain Company and twenty others, who asked an injunction to restrain the company from charging more than \$150 a year for unlimited services of the city.

The allegations in the bill of the Alton Company include those of excessive charges, from which relief is asked. "The grant," said Judge Mack, "was for twenty years and for the city of Chicago. It seems to me that on a grant of this kind there can be no doubt that the intent is that whatever may fall within the city of Chicago within twenty years is included within the terms of the grant, so far as permitting the company to occupy streets is concerned."

COURT COMPELS KEEPING OF CONNECTIONS.

IN case of the Johnson County Telephone Company vs. the Union & Telegraph Company, Judge Bollinger, of Davenport, Ia., has rendered a decision for the plaintiff. The case is one wherein the plaintiff asked an injunction restraining the defendant from cutting out the service arranged for under contract when defendants' franchise was under different ownership. The rate then for services rendered was made 5 cents, and the present owner of the franchise contended that this is not sufficient to pay the actual cost of transmission.

Last fall the defendant company severed connections, and the plaintiff sued out an injunction which was granted. The hearing was held in chambers before Judge Bollinger in January, and the judge advised both companies to adjust the matter between themselves. Several meetings were held but apparently to no purpose. No agreement could be made or reached. Therefore when the plaintiff company moved that the court render a decision, Judge Bollinger did so, finding for the plaintiff, and making the temporary injunction a permanent one.



IN THE OPERATING FIELD.

OHIO TELEPHONE ASSOCIATION MEETING.

ON Thursday, June 2d, the Independent telephone interests of Ohio will hold their convention at the Hartman Hotel, Columbus. This meeting promises to be well attended by not only the operating force of the various companies in the State, but also by a large number of those interested financially in the various companies. The meeting convenes at 9:30 A. M., and is expected to get through with its business that evening. During the past few months, a number of those interested in Independent telephone securities have been making trips around over the country on tours of inspection, and much interest has been awakened by these meetings in the general proposition. Those financially interested have found it desirable to get in close touch with the operating departments and with the general situation.

At this meeting there will probably be a consolidation of the Independent Telephone Traffic Association and the Ohio Telephone Exchange Association. There are in Ohio to-day over 147,000 Independent telephones connected up with the lines of the United States Telephone Company, and this service will be very materially increased during the next sixty days. By that time the United States Telephone Company will have completed lines connecting with the West Virginia system at Wheeling and with the Indiana system at Richmond, Ind., which will give a through circuit to St. Louis, Louisville, Ky., and many other points. The entire matter will be very carefully discussed at the convention.

THE FT. WAYNE COMPANY PROSPERS.

THE National Telephone and Telegraph Company, of Ft. Wayne, Ind., is one of the most progressive in the State.

The entire plant has been reconstructed and central energy systems are in operation in both main and branch exchanges. With over 3,000 subscribers working, new applications for service come in at the rate of from 75 to 100 a month. The Bell has not over 600 instruments in the same district. The bonds are bringing a 4 per cent. premium and the common stock can not be had on the market, although there are numerous applications. This company has three trunks to Van Wert, Ohio, four trunks to Huntingdon, Ind., four trunks to Kendallville, three to Garrett and Auburn, two trunks to Columbia City and lines to Sturgis, Mich., and Burroak, Mich. An additional No. 10 copper trunk is being built from Sturgis to Burroak. Besides these trunks there are numerous short lines east and west, giving the company unrivaled service in northern Indiana.

PROGRESS OF INDEPENDENT TELEPHONY SHOWN AT ST LOUIS EXPOSITION.

WHILE the telephone had just been invented when the Centennial was held in Philadelphia in 1876, the long distance lines were scarcely established at the time of the World's Fair in Chicago in 1893, and the Independent system had not been thought of at that time, the Louisiana Purchase Exposition finds a very extensive Independent exhibit in the Electrical building, including manual and automatic equipment, representing over 1,800,000 telephones in actual operation and an investment of over \$200,000,000. The securities representing this investment, according to the best estimates, are owned by 150,000 stockholders scattered throughout the business centers and rural districts of the United States. There will be no other exhibit at the Exposition that will be of special interest to so many people, no other business that has had its birth since the World's Fair in Chicago that will represent such an enormous investment, nor any exhibit that saves so much time, completely annihilating distances, furnishes so much protection and pleasure, or has done so much towards

revolutionizing the life of the farmer as the telephone. All of this has come about during the past ten years, since the Independent service was introduced.

CENTRAL STATES TELEPHONE ASSOCIATION MEETING.

THE directors of the Central States Telephone Association, which was recently organized by those interested in Independent telephone lines throughout Indiana and Illinois, held a meeting at Muncie, Ind., and elected the following officers: Frank M. Boyd, of Rockville, Ind., president; A. J. Heitz, of Vincennes, secretary; C. R. Duffin, of Terre Haute, treasurer.

The purpose of the association is to compile a rate and route book of the Independent lines throughout Indiana, Ohio, Kentucky, Illinois and Missouri. The headquarters of the association will be located in Terre Haute, and meetings will be held on call of the president.

LECTURE ON TELEPHONY AT IOWA STATE COLLEGE.

AT the seventeenth meeting of the Iowa State College Branch of the American Institute of Electrical Engineers, on May 18th, Mr. G. E. McFarland, superintendent of the Iowa Telephone Company, presented a paper on "Modern Telephone Engineering." The paper was illustrated with lantern slides, beginning with line construction, showing aerial wires, aerial cable construction, underground cable, cable entering exchange, and cable runs in exchange, main and intermediate frames, and exchange equipment. Mr. McFarland also took up the subject of traffic and service tests describing work that has been done and explaining how trained engineers may materially increase the quality of service and the efficiency of the plant by careful observation and rearrangement of the work.

INCREASED SERVICE AREA FOR THE P. AND A.

THROUGH two new connections which will be opened up next week, the Pittsburg & Allegheny Telephone Company will be able to reach from 8,000 to 10,000 new subscribers. The work of making the connection of the Tri-State Telephone Company's lines from Uniontown and Connellsville into Pittsburg was completed this week and the service will be thrown open to the public on Monday. On the same day the new line into the city of the Johnstown-Pittsburg Long Distance Telephone Company will also be opened. The latter takes the lines of the P. & A. through to Altoona. At this point they are met by the lines of the United Telephone Company and carried to Harrisburg, from whence the lines of the Keystone State Telephone Company take the service on to Philadelphia. The accession of the Tri-State lines to the Pittsburg & Allegheny, opens up to the latter company the southern section of Westmoreland, all of Fayette and Green counties, and the northern portion of West Virginia. The Johnstown-Pittsburg lines means service into all of Cambria and Somerset counties, and part of Blair county. Added to the P. & A. service are such towns as Greensburg, Uniontown, Connellsville, Johnstown, Somerset, Scottdale, and other places ranging in population from 2,500 to 15,000 people. In Johnstown the Johnstown Telephone Company controls the telephone situation, their subscribers numbering about 3,000. These are now joined to the P. & A. service through the completion of a working arrangement. Fully as many more are added in Connellsville and Uniontown and the remainder of from 5,000 to 6,000 are made up from all parts of the new territory. From Harrisburg to Philadelphia the wires of the P. & A. will be strung on the

poles of the Keystone State. It is this line which forms the eastern connection for the new Independent long distance service, which is to extend from the Atlantic coast to Kansas City, in which the Pittsburg & Allegheny officials will play such a prominent part.

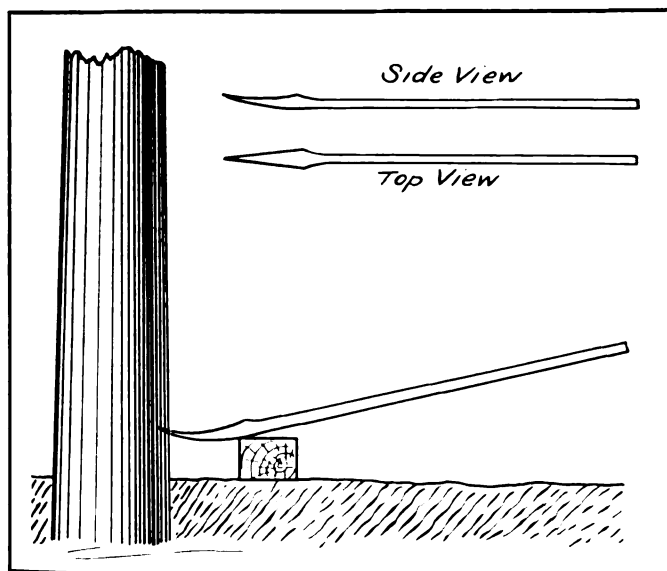
GRADUATED BY TELEPHONE.

AMONG those who were graduated from the high school of Waterville, O., was Frank Charles, a country boy, who, while at home the last month owing to a broken leg, completed his course with credit by the use of the telephone. Every night he called up his teachers in the village and recited his lessons to them.

A CONVENIENT METHOD OF PULLING POLES.

By E. C. STARKS.

THE writer has found the following method of pulling poles superior to any other. Take an ordinary crowbar and have the end drawn out and tempered as shown in the illustration. Its method of use is self-explanatory. Poles up to 70



feet in length have been pulled in this way by using three bars and moved ahead 15 feet without damaging the line wires in any way.

THE BELL COMPANY OUTGENERAELED.

IN an exciting race against time on the part of the Central Union Telephone Company and the Delaware and Madison County Telephone Company, whereby the first in the field was likely to get the new suburban line from Elwood to Curtisville, the Central Union was outgeneraeled by its sagacious rival. The manager of the Independent company learned that the Central Union forces would build the line on the 17th, and when the workmen arrived they found that the Independent company had been planting poles and stringing wires all night, having six gangs of men at work and the line well-nigh completed. The line will prove a good one, as all the farmers along the line and many of the Curtisville citizens will patronize the Independent company.

INDEPENDENT TELEPHONY AT SOUTH BEND, IND.

THAT the telephone field is most decidedly not a "natural monopoly" was never more thoroughly illustrated than by the situation at South Bend, Ind. This is a city of 21,819 population. In 1896 the Central Union had 240 subscribers at rates of \$44 and \$66 per year; an Independent company was organized, with rates of \$18 and \$30, and commenced operation with about 500 subscribers. The Central Union reduced their rates from \$24 to \$10.

In 1899, the Central Union purchased the Independent plant, paying a substantial profit for same, and immediately raised their rates to \$48 for business and from \$18 to \$36 for residence. July 1, 1901, they had 1,100 subscribers. The service was unsatisfac-

tory, so that a new Independent company was organized, which now has over 2,300 subscribers, owned largely by local people, with rates ranging from \$15 to \$36. The company is on a dividend paying basis. There are over 2,900 Independent telephones in the county.

There are a number of other places in the United States where the Bell people have purchased the Independent interests and in a very short time thereafter another Independent company was organized and again secured the business. There are more than twice as many telephones connected up with the Independent system in Indiana to-day as there are Bell telephones in that State.

THE OTTUMWA (IOWA) TELEPHONE PLANT FOR SALE.

AT the annual stockholders' meeting of the Ottumwa Telephone Company, held at Ottumwa, Iowa, May 25th, resolutions were adopted authorizing and instructing the trustee, in charge of the plant since last November, to sell the plant at private sale.

This action became necessary on account of the failure of the principal stockholders in the company, whose stock was put up as collateral, and by their failure, passed into the hands of their creditors. By an agreement with all the stockholders of the company the creditors are authorized to make a private sale of the plant, and in this way they avoid the necessity of court proceedings, which would cause increased expense and long delay.

The Ottumwa Telephone Company in the past two years built a substantial three-story semi-fireproof telephone building, with a red pressed brick front and limestone trimming, and also rebuilt the entire plant. They have installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing, and the necessary power and battery installation. They have installed 1,250 telephones, and there are 250 names on the waiting list. They have 80 miles of toll line, 70,000 lineal feet of conduit, 7 miles of aerial cable, with all the necessary fixtures and appliances.

The company is a growing concern and will have 1,300 telephones installed by the middle of June.

This is an excellent Independent Telephone proposition and will bear the closest inspection from anyone interested. Parties desiring further information can receive the same by addressing The Citizens' Savings & Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa.

THE QUEEN CITY TELEPHONE COMPANY WINS.

THE Probate Court of Ohio has decided that the Queen City Telephone Company was entitled to the use of the streets of Cincinnati for its wires and prescribed the manner in which the franchise should be exercised. This action, if sustained by the higher courts, breaks the monopoly hitherto held by the Bell Telephone Company in Cincinnati. Notice was given of appeal.

The Queen City Telephone Company is controlled largely by Indiana capitalists, the majority of them living in Indianapolis. The Indianapolis directors include H. D. Gates, J. T. Holliday, Joseph C. Sheff, W. F. Kuhn, W. S. Wishard, August Kuhn and E. I. Fisher.

HOW THE BELL TELEPHONE COMPANY'S METHOD FAILED.

ABITTER war has been waged for some time between the city authorities of Portland, Ind., and the Central Union Telephone Company over the contention by the city that the company has no franchise. The company claims that it has a franchise granted it in 1882. The city council passed a resolution ordering the arrest of the employees of the company if found at work on the streets previous to the production of the alleged franchise. Two workmen were put to work by the company, and they were promptly arrested, charged with obstructing the streets and alleys. They were no sooner released on bond until they were again set to work, only to be promptly rearrested. The city is determined to make the company show its franchise and will likely bring *quo warranto* proceedings to compel it to show such instrument if it has one.

TELEPHONE

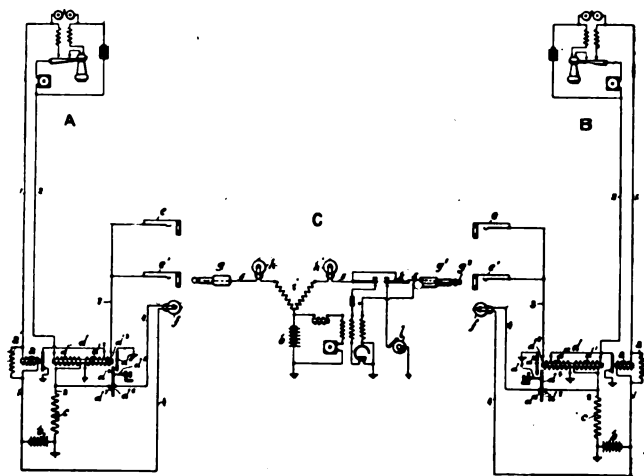


PATENTS

TELEPHONE EXCHANGE SYSTEM.

Charles E. Scribner, Jericho, Vt., patents (No. 760,573) an improved signal cord of a common battery switchboard circuit. This invention is shown in the accompanying illustration.

Each line comprises conductors 1 2, extending from the usual substations *A B* to the central office *C*. In the circuit of the line conductors are included the winding of a line-relay, *a*, shunted by a non-inductive resistance, *a'*; a central battery, *b*, a resistance, *c*, and one winding, *d'*, of a repeating-coil, *d*. As this repeating-coil is provided with an armature and acts both as a repeating-coil and a relay, it will be called a "repeating-coil" relay. The repeating-coil relay *d* contains two other windings, *d2* and *d3*, which are included serially in conductor 3, from the contacts of jacks, *e e'*, to a return conductor. One of these windings, *d2*, is short-circuited on normally closed contacts of relay, *a*. The repeating-coil relay *d* is so arranged that a certain magnetizing force will cause the armature to be attracted to close a contact, while any magnetizing force in excess of this will cause the armature to be attracted further to break one contact and close another, there lever *d4* normally rests against the contact-point *d5*. Armature *d6* when attracted makes contact with lever, *d4*, and moves it away from contact, *d5*, and against contact, *d7*. A signal lamp, *f*, is associated with the answering jack, *e'*, of the line, and is included in the circuit 4, which extends from the



free pole of the battery *b* to contact, *d5*. The armature of this relay is connected to earth. The contact-point, *d7* is connected with line conductor, 2, at a point between the resistance *c* and the winding *d'* of the repeating-coil relay. When armature, *d6*, is drawn up far enough to make contact with lever, *d4*, without causing said lever to move away from contact-point, *d5*, the circuit 4 is completed and the signal lamp *f* is illuminated. When the attractive force is such that the armature is drawn up to its full extent, the connection between armature, *d6*, and contact-point, *d5*, is broken, while connection between armature, *d6*, and contact, *d7*, through the medium of the lever is completed. This opens circuit 4, extinguishing lamp, *f*, and completes short circuit of *c*.

The connecting cord comprises plugs, *gg'*, united by conductor, 5, including serially supervisory signal lamps, *hh'* and windings of a repeating coil, *i*. The battery *b* is connected in bridge to ground from point in cord-circuit intermediate between the two windings. The windings of the repeating-coil, *i*, and signal lamps, *hh'* are of low resistance, each winding being 40 ohms and each lamp twenty ohms, and requiring a current of approximately two-tenths ampere. The resistance of winding *d'* of the repeating coil relay *d* may be 250 ohms. The resistance of winding *d2*

may be 170 ohms, and the resistance of winding *d3* may be 80 ohms. The resistance of resistance-coil *c* may be 500 ohms, and the electromotive force of the central battery *b* 24 volts.

The operation is as follows: The subscriber at *A* takes his telephone off the hook. The current from battery *b* energizes magnets of relay, *a*, and repeating-coil relay, *d*. The armature of relay, *a*, in drawing up breaks the normal short circuit of winding, *d2*, of repeating-coil relay, *d*. The magnetizing force is only sufficient to cause armature, *d6*, to be attracted into contact with lever, *d4*, without forcing lever, *d4*, away from the contact-point, *d5*. This circuit of conductor, 4, is completed and line lamp, *f*, illuminated. The operator inserts answering plug, *g*, into the answering jack, *e'*. Current then flows from battery, *b*, through circuit, 5 3, including one winding of repeating-coil, *i*, supervisory lamp, *h*, and windings, *d2* and *d3* of the repeating-coil relay. The short circuit of winding, *d2*, of the repeating-coil relay being broken in contacts of relay, *a*, current flows through windings, *d2* and *d3*, and the attractive force generated in addition to that generated in winding, *d'*, is sufficient to cause armature, *d6*, to sever connection with contact-point, *d5*, and close connection with contact-point, *d7*, extinguishing line lamp, *f*, and short circuiting resistance-coil, *c*. This short circuit increases the flow of current in the line-circuit and through winding, *d'*, and thus strengthens the attractive force upon the armature. The current through conductors, 5 3, and the included apparatus is insufficient to illuminate supervisory lamp, *h*, which remains dark. As windings, *d2*, *d3*, of repeating-coil relay are in inductive relation with the winding, *d'*, included in the telephone line 1 2, extending to the calling-substation, the operator, by operating the key which connects her telephone-circuit with the line, may place herself in communication with the calling-subscriber. Upon learning order she tests as usual, and finding the desired line disengaged inserts plug and rings *B*. When the calling-plug is first inserted in the jack current flows to earth from battery, *b*, through supervisory lamp, *h*, by conductors, 5 3, and winding, *d3*, of the repeating-coil relay. Until the called subscriber responds winding *d2* of the repeating-coil relay of his line is short circuited in the normally closed contacts of the relay *a*. The resistance of winding, *d3*, is low, so that under these conditions the flow of current through the circuit 5 3 is sufficient to cause the illumination of supervisory lamp, *h'*. The heavy current which flows in conductors 5 3, owing to the winding, *d2*, of the repeating-coil relay associated with the called line being short-circuited, is sufficient to generate an attractive force in the repeating-coil relay which draws the armature up as far as it will go, thus breaking the circuit of the line lamp, *f*, and completing the short circuit, *c*, as soon as the calling-plug is inserted. When the subscriber removes his telephone a circuit is completed from battery, *b*, over line conductors, 1 2. This current, flowing through relay, *a*, causes it to break the short circuit of winding, *d2*, of the repeating-coil relay. The additional resistance thrown into circuit of conductors is sufficient to so reduce the current that the supervisory lamp, *h'*, is extinguished. The current which, as soon as the called subscriber removes his telephone from the hook, circulates in winding, *d'*, of the repeating-coil relay, is such as to augment the effect of that which has been circulating in winding, *d3*, and which upon the actuation of relay, *a*, flows serially through windings, *d3* and *d2*, so that the armature *d6* is held in the same position to which it was moved by the current primarily flowing. When the subscribers finish their conversation the replacing of their receivers upon the hooks breaks the circuit of the lines and causes the de-energization of line relays, *a a*. The armatures falling back re-establish the normal short circuits of windings, *d2*, *d2*. The resistance in circuits, 5 3 5 3, being thus reduced, there is current sufficiently great to effect the illumination of supervisory lamps, *h h'*.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



AN INTERMITTENT CROSS.—(343.)

Can you tell me by means of the following sketch what might have been the trouble with instrument No. 2? What I found on inspection was this: Could not be heard from instrument No. 1. Could be heard fairly well from No. 2. Cutting off instrument No. 2 could be heard O. K. from No. 1. Bells at both instruments would not ring at times.

J. T. R.

Your trouble is probably an intermittent cross between the windings of the coil at No. 2 instrument. By disconnecting instrument No. 1 and opening the bell circuit of No. 2 at point indicated by the arrow, Fig. 343, a test for condenser will show a deflection, the circuit being completed through the crossed windings of the coil. The reason you could not be heard from No. 1 instrument is that the low resistance of the crossed winding acted as a shunt for the rapidly varying voice currents. Being heard fairly well from No. 2 instrument was due to the inductive effect of part of the winding aided by the varying capacity of the condenser.

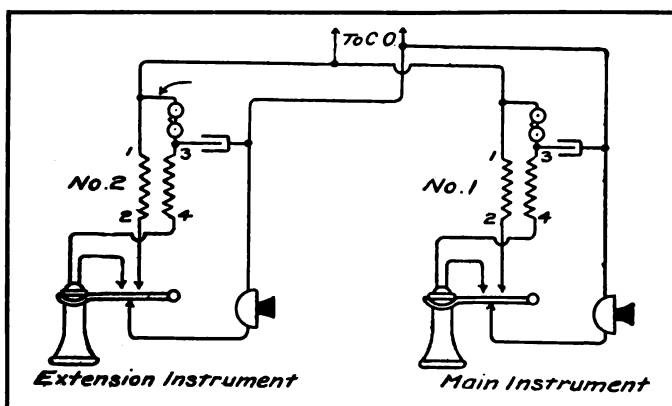


Fig. 343.

ed by the arrow, Fig. 343, a test for condenser will show a deflection, the circuit being completed through the crossed windings of the coil. The reason you could not be heard from No. 1 instrument is that the low resistance of the crossed winding acted as a shunt for the rapidly varying voice currents. Being heard fairly well from No. 2 instrument was due to the inductive effect of part of the winding aided by the varying capacity of the condenser.

NECESSITY OF LINE PROTECTION.—(344.)

Is it necessary to protect a line with carbon arresters and fuses at the instrument as well as at the exchange

T. G.

This depends entirely as to whether the lines are in proximity to power circuits. If they are so that they might get crossed then fuses are necessary at both ends to protect the apparatus from being burnt out. Generally at exchanges heat coils are used instead of fuses, and are operated by the quantity of current flowing in a given time generating heat, and so opening the circuit. Carbon protectors, when properly installed and having a good ground, are the best protectors against lightning. They should in all cases be placed at the instruments as well as at the exchange.

TELEPHONE LINES NEAR HIGH TENSION CIRCUITS. (345.)

We contemplate running a toll line along a country road where there is a high tension line on one side. As it is impossible to get the right of way on the other side of the road, how far away should our wires be placed from the power circuit, and what number of transpositions should be used?

L. T. C.

Telephone lines should be separated at least six feet from circuits carrying current at 1,000 volts and over. It would be preferable to build a separate pole line and not use the poles carrying power. If you do use the same poles it is better to place the telephone line under the high-tension line, since the latter will be a much heavier wire and not so liable to break. Besides in making repairs there is not the liability to personal injury that

would occur if a man had to climb up between the power wires. Transpositions should be cut in from four to six to the mile.

SELECTIVE SIGNALING.—(346.)

Is selective signalling practical on party lines which have six or more stations? Is the apparatus complicated, and could it be adapted to a regular magneto board?

P. L.

Systems for selective signaling have been devised to operate 10 party lines, but have never proved satisfactory. Four parties on a line are generally the most that can be operated selectively. The means used to obtain selective results vary. Some operate with pulsating current of positive and negative polarity, others with different alternations. One method employs the principle of mechanics, which limits the vibrating speed according to the weight of the hammer to be vibrated, and still others utilize one form or another of step by step mechanism. In all cases special keys must be used, and also the source of power causes a difference in the ringing apparatus. It is probable that selective signaling could be adapted to your board if it is not of too old a type. Selective apparatus, though not necessarily complicated, requires more attention to maintain adjustment of bells than is necessary with the ordinary method of magneto signaling.

CABLE DISTRIBUTION.—(347.)

Please outline in your queries a good bridging cable distribution with 30, 60 and 120 pair pole tops.

S. T.

It would be impossible to outline such a distribution as you suggest without knowing whether you have in view cable or open line work, and also if you mean distribution by means of multiple system or by the dead ended method. If you will give a more explicit query we will be better able to answer it.

METHOD OF TYING GROUND WIRE.—(347.)

Will you please illustrate the best way to fasten a ground wire to a pipe? I have had a lot of trouble in not being able to secure a good connection in this way.

J. T.

One of the best methods of tying a ground wire is illustrated in Fig. 347. The pipe should first be thoroughly cleaned by filing till the surface is smooth and bright. Some people advocate a wrapping of tinfoil to prevent ultimate rust and chemical action. The ground wire should be not less than No. 16, and be cleaned

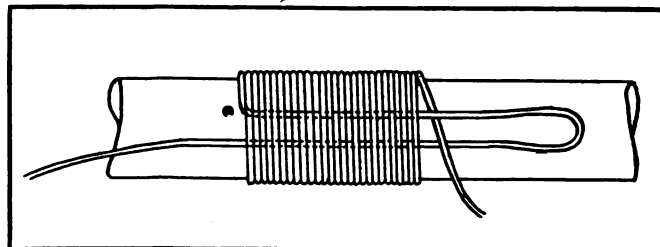


Fig. 347.

thoroughly before wrapping. Place the loop as shown in the illustration parallel to the pipe, and wrap back over it with the free end of the wire about sixteen turns. Then place this end through the loop and pull tightly on the other, when the loop will be pulled under the wrappings. To make this tie more secure it may be soldered. It is advisable to cover the turns with tin foil and tape them up thoroughly to prevent moisture getting into the joint. If a gas pipe is used for a ground, the meter should always be bridged by a jumper, to prevent the circuit being opened if the meter is taken out. Always use a water pipe, if possible.



THE WEEK'S MESSAGES

FINANCIAL.

FREDERICKTON, N. B., CANADA.—The capital stock of the Central Telephone Company, Ltd., has been increased from \$10,000 to \$209,000. The powers of the company are extended to the whole Province.

LONG BEACH, CAL.—The Home Telephone Company will increase its capital stock to \$100,000.

DECATUR, ILL.—The Macon County Telephone Company, of Decatur, has increased its capital stock from \$5,000 to \$25,000.

HARDIN, ILL.—The Calhoun Telephone Company, of this town, has increased its capital stock from \$15,000 to \$25,000.

MANLIUS, ILL.—The Bureau County Mutual Telephone Company, of Manlius, has filed a certificate with the Secretary of State, stating that it has increased its capital stock from \$2,500 to \$20,000.

SAVANNA, ILL.—The Carroll County Independent Telephone Company has filed a certificate with the Secretary of State, increasing its capital stock from \$75,000 to \$150,000.

MECHANICSVILLE, IA.—The Mechanicsville Telephone Company, incorporated July 1, 1901, with a capital stock of \$3,500, has amended its articles of incorporation, increasing the capital stock to \$10,000, and limiting its authorized capital stock to \$20,000. Alexander Buchanan is president of the company, and Frank L. Wilson, secretary.

NEVADA, IA.—A meeting of stockholders of the Nevada Mutual Telephone Company was held recently, at which the capital stock of the company was increased from \$15,000 to \$22,500. The increase is to pay for several rural lines that have been constructed and that are to be constructed this summer, together with other improvements to the system.

CLINTON, MO.—The Clinton Mutual Telephone Company has increased its capital stock from \$20,000 to \$50,000.

YOUNGSTOWN, O.—The surplus earnings of the Youngstown Telephone Company for the month ending April 4th are \$1,093, a gain of \$310 over the preceding month.

ROCHESTER, N. Y.—A special dividend of 10 per cent. was declared at a meeting of stockholders of the Stromberg-Carlson Telephone Company. It was voted to increase the capital stock from \$4,500,000 to \$6,000,000.

CHARLOTTE COURT HOUSE, VA.—The directors of the Central Telephone Company have declared a semi-annual dividend of 5 per cent. and placed 3 per cent. to sinking fund.

FRANCHISES.

BRANTFORD, ONT., CAN.—It is stated that the city council at its next meeting will decline to grant the Bell Telephone Company renewal of its franchise, and that it is prepared to receive proposals from independent telephone companies.

CHENOTH, CAL.—The board of supervisors has granted a franchise to the Home Telephone Company to construct a line from Pomona to Rincon.

COLORADO SPRINGS, COLO.—The Citizens Automatic Telephone Company, backed by D. W. Donaldson, E. J. Eaton, Rev. J. W. Finkviner, and forty-two other citizens of Colorado Springs, have asked for a local franchise.

CEDAR FALLS, IA.—The city council has passed an ordinance granting a franchise to the Cedar Falls Mutual Telephone Company. A special election will be called, at which the citizens of this town will vote on the question.

EXCELSIOR SPRINGS, MO.—Thomas A. Dracey, owner of the local telephone exchange, has asked for a new franchise for twenty years.

GRAND FORKS, N. D.—A telephone company has been granted a franchise to put in a line to Kensal township.

FRANKLIN FALLS, N. H.—The Citizens Telephone Company has been granted a franchise to run its lines to Northfield Center and Zion Hill.

HIGHBRIDGE, N. J.—The Farmers' & Merchants' Telephone Company has asked the common council for a franchise to construct a local system.

CINCINNATI, O.—The Probate Court has decided that the Queen City Telephone Company is entitled to the use of the streets of Cincinnati for its wires, and the court prescribed the manner in which the franchise should be exercised. The Bell Company has given notice of appeal.

SHAWNEE, OKLA.—The Pioneer Telephone Company has asked the city council for a franchise for its telephone line.

CORVALLIS, ORE.—A franchise has been granted the Corvallis Telephone Company for a system in this place.

ELECTIONS.

FAIRFIELD, IA.—At the annual meeting of the Jefferson County Telephone Company, the following officers were elected: J. C. Thorne, president; Ed. Thorne, vice-president; E. F. Simmons, secretary; Frank Light, treasurer; J. C. Thorne, Ed. Hunt, E. F. Simmons, Frank Light, E. A. Howard, V. A. Lamson and Dr. R. C. Sayers.

FULTON, IND.—The following officers have been elected by the Fulton Telephone Company: President, George Rentschler; secretary and superintendent, H. L. Becker; treasurer, E. E. Jackson.

MAPLETON, IA.—The Maple Valley Telephone and Telegraph Company, at a meeting held here, elected W. H. Leathers, president; J. C. Hammond, vice-president; C. H. Smith, secretary; T. B. Lutz, treasurer; Charles G. Cockerill, of Jefferson; W. B. Booker, of Danbury, and Charles I. Whiting, of Mapleton, directors. A franchise was declared and arrangements made for connection with the Sioux City toll lines.

BETHEL, ME.—The Bethel Telephone Company has elected Fred. L. Edwards, president; F. F. Bean, vice-president; Dan Smith, clerk and treasurer. Arrangements were made for the construction of several lines.

LITCHFIELD, NEB.—The Round Grove Telephone Company has elected the following officers: R. R. Martin, president; A. M. Rumery, vice-president; C. W. Martin, secretary, and L. C. Smith, treasurer.

COMBINATIONS.

HOPE, IND.—Frank Bowman, of Hope, has purchased the Hartsville Telephone system from H. J. Cottle, of that town. He has consolidated the systems in Hope and Hartsville.

EMERSON, NEB.—The Home Telephone Company and the Clark Automatic local exchange will be consolidated.

GLENS FALLS, N. Y.—The Union Telephone Company, of Glens Falls, and the Rensselaer Telephone Company, of Troy, will be consolidated.

BRISTOL, PA.—The Standard Telephone and Telegraph Company, a corporation whose lines extend into many parts of Bucks county, has been absorbed by the Keystone Telephone Company, of Philadelphia, a larger and stronger corporation. The Standard's offices in the Witherspoon Building, Philadelphia, have been closed, and all the company's business is now transacted at the Keystone headquarters.

DAVENPORT, WASH.—John Hansen, who bought the Davenport exchange of the Inland Telephone Company, is negotiating for the purchase of the Reardan exchange.

PERSONAL.

MR. CHUFI AWOYAMA, electrical engineer to the Imperial Tokio Telephone Exchange, has sailed for home after a brief stay in the States. He will recommend the purchase of electrical machinery of American manufacture.

H. A. CRAWFORD, manager of the Mutual Telephone Company, at Rhinelander, Wis., has resigned to accept a similar position with the Wausau Telephone Company.

WALTER FREDERICKS, chief draughtsman of the Keystone Telephone Company, Philadelphia, Pa., has been elected associate member of the American Institute of Electrical Engineers.

W. J. GARDNER, wire chief for the New Union Telephone Company, at Glens Falls, N. Y., has resigned, and is succeeded by C. A. Owens, of Elmira.

H. C. SLEMIN, telephone engineer, with the Stromberg-Carlson Telephone Manufacturing Company, has been elected associate member of the A. I. E. E.

MISCELLANEOUS.

MELROSE, FLA.—The Melrose Telephone Company has completed a line to Campville via Orange Heights.

FOREST CITY, ILL.—The Forest City Telephone Company has increased its number of directors from three to five.

MALTA, ILL.—The Tri-County Telephone System is now connected with the Union Central long distance lines, giving them toll service to Steward, Lee, Esmond and Lindenwood.

ELKHART, IND.—The Home Telephone Company is considering plans to connect the Granger exchange with the exchange at Pullman's Corners, Union, Elkhart, Goshen and Bristol.

MUNCIE, IND.—The Citizens' Telephone Company has installed a new switchboard.

MARSHALLTOWN, IA.—The Jewell and Kamvar Telephone Companies have completed a line to this town, connecting the two systems.

TOPEKA, KANS.—The Independent Telephone Company will move into larger quarters on account of growing business.

PLATTSMOUTH, NEB.—The Plattsmouth Telephone Company has purchased a new brick building. After making extensive alterations in the building, the telephone exchange will be removed from the Coates block to the new location.

ROCHESTER, N. Y.—The Chicago works of the Stromberg-Carlson Telephone Company will be moved here.

WATERLOO, N. Y.—The Seneca County Home Telephone Company has connected its line with Geneva and now announces a long distance service to all points west, while in Waterloo and Seneca Falls it has extended its line until there are 198 telephones in Seneca Falls and 123 telephones in Waterloo.

BUTLER, PA.—The People's Telephone Company will connect with the lines of the P. and A. Telephone Company.

MCKEESPORT, PA.—The Pittsburg and Allegheny Telephone Company has completed its system here.

ROSCOE, PA.—The Union Telephone Company, of California, will install a system here.

NEW COMPANY NOTES

WATSEKA, ILL.—The Fountain Creek Telephone Company has been incorporated with a capital stock of \$24,000. G. H. Weil is president.

BLOOMINGTON, IND.—The Bloomington Home Telephone Company has been incorporated with a capital stock of \$150,000 to operate exchanges in Bloomington and Monroe county.

FLORA, IND.—The Flora & Bringham Co-operative Telephone Company has filed articles of incorporation with a capital stock of \$12,000. The incorporators are: H. A. Thomas, William F. Wagner, James H. Coplin.

MONROVIA, IND.—The Monrovia Telephone Company has been incorporated with a capital stock of \$2,200, to build a telephone system in Morgan and Hendricks counties. W. H. Hubban is president.

SHELBYVILLE, IND.—The Loss Creek Mutual Telephone Company has been incorporated with a capital stock of \$350. The principal organizer is F. H. Hemphill.

SPENCER, IND.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of \$10,000. It will operate systems in Owen, Monroe, Morgan, Clay, Putnam and Green counties. J. S. Snodgrass, J. Smith, E. L. White and S. H. Alverson are the incorporators.

ELKHART, IA.—The Elkhart Mutual Telephone Company has been incorporated with a capital stock of \$10,000.

KINKAID, KANS.—The Eastern Kansas Telephone Company has been incorporated with a capital stock of \$5,000. The officers are: President, J. W. Garrison; vice-president, A. P. Caldwell; secretary and manager, R. S. Fraser; treasurer, J. M. McCartin.

ST. CLOUD, MINN.—The Belgrade Telephone Company has been organized here with a capital of \$12,000. The officers are: S. J. Anderson, president; C. Borgarding, vice-president; J. T. Chisholm, secretary, and Dr. Ridgeway, treasurer.

LEONARD, N. D.—A telephone company has been incorporated to construct lines in this vicinity. Richard Piper is president.

KEESEVILLE, N. Y.—The Keeseville Telephone Company has been incorporated with a capital stock of \$20,000. The directors are J. H. A. Bond, J. B. Mace, and others.

ALVORDTON, O.—The Alvordton Telephone Company has been incorporated with a capital stock of \$10,000 to give telephone service to the towns of Alvordton, Kunkle and Primrose. The officers are: A. L. Bigelow, president and general manager; C. F. Poulson, secretary and local manager.

GILBERT, O.—The Gilbert Telephone Company has been incorporated with a capital stock of \$2,000. The incorporators are: E. L. Roe, Charles Menefee, H. L. Nye, J. B. Rhodes, W. M. Bateman, S. W. Winn. The company will construct and operate a local exchange through Muskingum county, with Gilbert the exchange station.

PLEASANT CITY, O.—The Pleasant City Telephone Company has been incorporated with a capital stock of \$10,000 to build a line from Pleasant City south to Ada. The incorporators are: C. L. Stranahan, J. H. B. Danford, William Miley, Harmon Miley, E. Stranahan, F. Danford.

DURKEE, O.—The Express Telephone and Telegraph Company has been organized here with a capital stock of \$1,500, to give telephone service in Baker county. The incorporators are W. G. Ayre, F. S. Bubb and F. L. Moore.

HONESDALE, PA.—The Honesdale Telephone Company has been incorporated with a capital stock of \$40,000. Treasurer, Albert F. Moat, Scranton; directors, Wm. C. Harding, Edward M. Prisk, W. R. Prior, Jr., Albert E. Moat, Frank Brenton, Scranton.

TAYLORSVILLE, TENN.—The Smith County Telephone Company has been organized here with a capital of \$5,000.



New Construction in the Field



GENTRY, ARK.—A system of telephones to connect with the farming community is being talked of in this vicinity.

IMPERIAL, CAL.—The Imperial Telephone Company will extend and improve its line.

POMONA, CAL.—The Pomona Valley Telephone Company is rapidly increasing the number of its subscribers, of which it has now 550. A line is being built to Spadra and Lemon.

SAN DIEGO, CAL.—The Home Telephone Company is receiving material for reconstruction of its aerial and underground system.

EVANS, COLO.—The Independent Telephone Company is arranging to install a new section of its switchboard.

NEW CASTLE, COLO.—The Garfield Telephone Company, of New Castle, has been incorporated with a capital stock of \$50,000. Extensive additions are being made to the present plant and additional wires will be strung to Rifle and Divide Creek. Work on the Glenwood extension will begin as soon as this work is completed.

QUITMAN, GA.—A contract has been let for the construction of the Okaplico Telephone Company's line from Quitman to the northern part of the county, a distance of about 15 miles.

HILLSBORO, ILL.—The directors of the People's Mutual Telephone Company met at Hillsboro recently, and made arrangements to construct a new line from Harvel to Nokomis. The directors also planned to extend the line into Bond county, so as to connect Greenville with Hillsboro and several other towns.

GREENFIELD, IND.—The exchange of the Greenfield Home Telephone Company was damaged by fire on May 25th. Two large cables containing 100 wires each were melted, and a costly fuse board destroyed. The company will install new apparatus.

HARMONY, IND.—A new telephone exchange is being installed here which will connect with the Citizens' exchange of Brazil.

MICHIGAN CITY, IND.—The Merchants' Mutual Telephone Company, of this city, will overhaul and reconstruct its local system this summer, at an outlay of \$15,000.

NEWPORT, IND.—The Star Telephone Company will install a system here. Work is being pushed on its system at Paoli.

STERLING, ILL.—A telephone line is to be constructed between the towns of Harmon and Sublette.

DIKE, IA.—John Sprague, of New Hartford, is constructing a line from there to Dike, and will probably install an exchange at Dike.

CENTERVILLE, IA.—A. G. Davidson, W. J. Jones, Newton Harris and J. M. Ellis have been appointed a committee to purchase supplies for the new lines and exchange to be built here by the Farmers' Mutual Telephone Company.

MARSHALL, IA.—W. G. Bowe, superintendent of the Marshall Telephone Company and the Long Distance Copper Company, is at Morengo arranging for the installation of an exchange.

MASSENA, IA.—The Massena Telephone Company will construct a new line northwest of town.

ROCK VALLEY, IA.—The Farmers Telephone Company is building the line from Inwood which will connect with the Rock Valley exchange.

LAKE CITY, MINN.—The Northwestern Telephone Exchange Company will establish a system here.

TYLER, MINN.—The Tyler Telephone Company will build a line south of town.

MARSHALL, MO.—The Saline Telephone Company will build a new line to Napton.

CALDWELL, NEB.—The Platt Valley Telephone Company will construct a new line from here to Horse Creek.

ADAMS, N. D.—The Farmers Consolidated Improvement Company will extend its telephone system to the neighboring towns.

EDINBURG, N. D.—Edinburg is to have a local telephone exchange.

LEONARD, N. D.—A local telephone company has been organized and will construct forty miles of line, taking in Lynchburg, Everest and Davenport.

PAGE, N. D.—The Union Telephone Line will construct a line in town, and three rural lines; one line to Erie; one to run north and east, and another to run west into Barbes county.

WAKONDA, S. D.—The Wakonda Telephone Company has purchased a new switchboard, which will be installed early in June.

MANCHESTER, N. H.—The Citizens' Telephone Company will extend its system here owing to growing business.

TILTON, N. H.—The Citizens Telephone Company is building a line to Sanbornton Bay, and will build one to Canterbury via Northfield.

CAMDEN, N. J.—The Eastern Telephone Company has completed a line to Atlantic City.

READING, N. J.—The Reading Telephone Company is extending its system.

LISLE, N. Y.—The Lisle Rural Telephone Company has extended its lines to Cadwell settlement.

WHITE CREEK, N. Y.—The White Creek Telephone Company is constructing an extension of its line to Post Corners.

ASHLAND, O.—The Star Telephone Company is enlarging its switchboard to accommodate its rapidly growing business.

BUCYRUS, O.—The Bucyrus Telephone Company has just completed a line to Ridgerton. The company has also purchased from J. T. Carbin, of Seneca county, the line owned and operated by him running to Spore and Brokensword quarries, and has connected it to the local exchange.

NEW MOOREFIELD, O.—The Home Telephone Company, of Springfield, is building a line to Mechanicsburg from this town.

DALTON, PA.—The Ransome and Newtown Telephone Company has built a line from Waverly to this town.

MINERAL WELLS, TEX.—The Keechi Valley Independent Telephone Company, of Mineral Wells, is constructing a line into this city to connect with the Riddle Telephone Company. A line will also connect Christian, Graford, Dark Valley and Palo Pinto with this city.

VERNAL, UTAH.—The Vernal and Fort Duchesne Telephone Company is constructing an extension of its line to Jensen, a distance of about fourteen miles.

GREEN BAY, VA.—The Southside Telephone Company, of Worsham, has completed a line from here to Farmerville, giving connection to Burkeville, Rices Depot, Prospect, Hampden-Sydney, Keysville, Charlotte Courthouse and Drakes-Branch.

THE INDEPENDENT LONG DISTANCE SITUATION.

PRELIMINARY plans are being made for the co-operation of the Independent Long Distance companies of the United States. The companies that are at present working together to this end to compete with the American Bell system are: The Pittsburg & Allegheny Company, which covers western Pennsylvania; the United States Telephone Company, which covers the entire State of Ohio; the New Long Distance Telephone Company, which covers Indiana and laps over into Illinois; the Long Distance Telephone Company of Kentucky; the Kinlock Long Distance Telephone Company of Missouri, one of the strongest Independent lines in the country; and the Kansas Long Distance Telephone Company of Kansas. This will be supplemented by a concern organized in Illinois.

A representative from each of these companies comprises a committee which will consider and outline operating plans. A line is being built from Pittsburg to Youngstown, O., and thence to Cleveland. Another is under construction to Wheeling, W. Va. This will be part of the main route between Pittsburg, St. Louis and Kansas City. The same line is also being extended east to Baltimore, and another branch is being extended to Philadelphia. A line is being built from Chicago to Elkhart, Ind., and the Illinois Telephone & Telegraph Company is building its line from Chicago to St. Louis. This line will also be extended to Kansas City. The development will be extended to Wichita, Kans., and into the Indian Territory and Oklahoma, and before long will be connected with the system in Texas.

TRADE NOTES

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, is issuing a cordial letter of invitation to all telephone men to visit its headquarters at the St. Louis exposition, section 24, Palace of Electricity.

THE LAMBERT-SCHMIDT TELEPHONE MANUFACTURING COMPANY, Sub-Station 1, Hoboken, N. J., has just shipped a 270-drop central energy switchboard and telephones to Grand Hotel Station, New York.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, has secured the contract for the common battery switchboard for the Newark Telephone Exchange, Newark, N. Y. The Century Company will also furnish the substation instruments.

F. LUBBERGER, of Chicago, Ill., has issued a pamphlet outlining a course of instruction in automatic telephony, which he will give, commencing May 31st. The course embraces reviews of electricity and magnetism and manual telephony, as well as automatic.

THE NEWARK TELEPHONE EXCHANGE, Newark, N. Y., has placed its order for its entire common battery equipment with the Century Telephone Construction Company, of Buffalo, N. Y. The company expects to give its subscribers service with the new equipment within a very short time.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., is furnishing additions and switchboard equipment for the following cities: St. John, Wash; Westington Springs, S. D.; Hamilton, Mo.; Chardon, O.; Roanoke, Va.; Johnson City, Ill.; Indianapolis, Ind.; Lorain, O.; Des Moines, Ia.; Hoopetown, Ill.

THE HOLTZER-CABOT ELECTRIC COMPANY, of Chicago, Ill., has issued a folder which describes how to get its numerous bulletins and booklets of its apparatus, of which there are thirty-three. All those engaged in the telephone business should send for this folder, which will prove most valuable to them.

It is rumored that Leroy Kellogg, son of Milo G. Kellogg, has resigned as secretary and treasurer of the Kellogg Switchboard and Supply Company, and will open an office as a consulting engineer. From the same source comes the information that Franz J. Dommerque has been elected secretary of the Kellogg Company.

THE F. BISSELL COMPANY, of Toledo O., reports large sales of its "Special" dry battery. This dry cell operates under the most exacting requirements, and in long life and efficiency it is the acme of all cells. Its extremely low internal resistance (less than that of any other cell), together with its recuperative powers, makes it specially adaptable to telephone conditions.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, of Meriden, Conn., reports very large sales on its new type of magneto test sets. It has brought out a light and compact and durable set, fitted with full nickel corner pieces. This company is furnishing large numbers of this style of set to the trade, and have met with decided success. This set is sold at a reasonable price.

A. BUSHNELL, of Kansas City, Mo., has issued a circular treating on the protection of wooden poles. His specialty is cypress poles, and these, when treated, last three times as long as any other. Instances are given to prove this statement. Cypress poles in sizes from 30 to 70 feet are much lower in proportionate cost than cedar poles is claimed by Mr. Bushnell, and all those interested should write for particulars.

THE W. G. NAGEL ELECTRIC COMPANY, of Toledo, Ohio, reports an ever increasing demand for its "Ready" Payout Reels. These reels, on account of their construction, readily appeal to the practical construction man. Parts being all interchangeable makes them an easy reel to repair should they become broken, and the reels with tension attachment are especially desirable to regulate the paying out of telephone wire. Descriptive matter relative to the "Ready" reels will be gladly forwarded by writing to the above company.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, of Meriden, Conn., has placed upon the market a new type of desk telephone. All working parts of this stand are entirely enclosed, making it free from handling, and absolutely dust proof. The hook switch is small and durable. The construction of this instrument has brought many compliments to the company for its high class of manufacture, both for finish and mechanical construction. The instrument is equipped with their new solid back transmitter and self-contained receiver, which makes the instrument one of the most powerful yet placed upon the market. The company has issued a bulletin describing the stand, showing the inside and outside construction, which will be mailed on request.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—The Ottumwa Telephone Company's plant at Ottumwa, Iowa, including Franchise and all its property. The Company owns the three-story brick building, built two years ago, in which is installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing apparatus, all of the latest and the best. 1,250 telephones are installed, with 250 names

on the waiting list. The Company also owns 80 miles of toll lines. This is one of the best telephone propositions in the State of Iowa. For full particulars, maps and photographs, address the Citizens' Savings & Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa. 187

FOR SALE—Will exchange modern improved farm of 241 acres, value \$12,500, for a good paying telephone exchange. For particulars, address Box 457, Oxford, Ohio. 190

FOR SALE—60,000 1¼ x 8 locust pins, No. 2 quality, at price of \$3.50 per 1,000, in lots of 500 pins and up, f.o.b. cars North Wilkesboro, N. C. J. S. BOGGS, Albany, Georgia. 185

FOR SALE—Switchboards and Telephones, all capacities and makes, Terminals, Cross-connecting Racks, Cable, &c., at less than half cost of new. Guaranteed reliable and efficient. Chicago Telephone Apparatus Exchange, 17 S. Elizabeth St., Chicago, Ill. 184

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

IT seems to me that I am the man you are looking for. My specialty is managing small exchanges profitably and satisfactorily. I don't want too much salary. I'd like to send you my references and qualifications anyway. Address, Box 160, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 160

WANTED—Several A "I" Telephone Solicitors. State salary expected, age, experience; give reference. Address, Box 186, AMERICAN TELEPHONE JOURNAL, New York City. 186

SALESMEN WANTED—Reliable men to carry as a side line an up-to-date line of advertising calendars sold to furniture hardware, drug, shoe and general merchants. Convenient to carry; prompt remittances. GEO. H. JUNG & CO., Cincinnati, O. 182

POSITION WANTED AS MANAGER of an exchange, preferably in the Middle West, of about 500 subscribers or less, by a technically trained young man. Experienced in line construction and management. Thoroughly up-to-date on circuits, rates and duties necessary to make a first-class showing. References. If you are contemplating a change in your management or feel that the system could be run to better advantage, address, Box 179, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 179

WANTED—Second-hand Telephone Apparatus, Central Energy and Magneto Switchboards, Telephones, Bridging Bells, Transmitters, Terminals, Cross-connecting and Distributing Racks, Ringing Generators. State details, price, condition and make. C. E. W., 17 S. Elizabeth St., Chicago, Ill. 188

WANTED—A practical telephone man with best of references. One central energy and two magneto exchanges. 500 telephones. Write for particulars to C. H. WEBB, Petersburg, Ind. 189

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,500 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL. GILDART BROS., Albion, Mich. 168

MAYBE OUR PRICE

is not the lowest. But maybe the other man don't ship the poles when you want them.
MAYBE you find some poles not up to standard.

Better order where you are SURE.

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Bessemer Building.

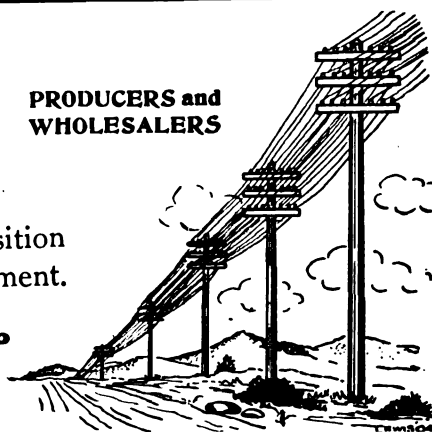
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

PRODUCERS and
WHOLESALEERS



"From the Stump
to the Line."



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.



LONG

POLES

A

SPECIALTY

H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS

ELMORE-FOWLER-JACOBS CO.

JUSTICE MAY BE BLIND—

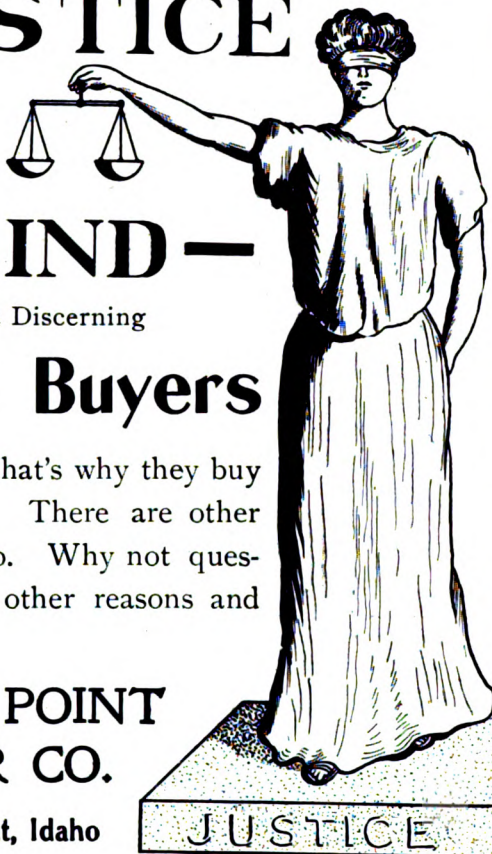
But Discerning

Pole Buyers

are not. That's why they buy our poles. There are other reasons, too. Why not question us for other reasons and prices?

**SAND POINT
CEDAR CO.**

Sand Point, Idaho



Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

The Valentine-Clark Co.

*Begin to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**



A SPRING BINDING POST.

Protected by Patent.

Grips the wire without the use of a screw. Grips any size wire that can be put into it and holds it so firmly that a loose contact is impossible. Wire can be put in or taken out in one-tenth the time it takes to adjust a screw post and there is no possibility of the wire being broken off in the operation.

Just the thing for wire connections that have to be changed often because of the ease with which it can be done, and just the thing for wire connections that are to be permanent because of the surety of the contact.

The wire can not jar loose.

Contractors should demand this post on their electric bells and annunciators. It will insure their reputation for permanent work and save lots of complaints. Ask to have your dry batteries equipped with it and notice how easily they are connected up—and stay connected.

Just the thing for automobile batteries.

It is cheaper than any good screw post on the market and can take the place of an expensive one. Write to us about it.

The Fahnestock Transmitter Co., 132 Havemeyer St., Brooklyn, N.Y.
SWAZEY & SMITH, 53 State St., Boston, Mass., New England Selling Agents

NEW TRUNKS

ARE NOT AS GOOD AS
EXPANDED

Metal Lockers

FOR YOUR OPERATORS.

A *Safe and Sanitary* place to leave wraps.
Increases the efficiency of your Exchange.
In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

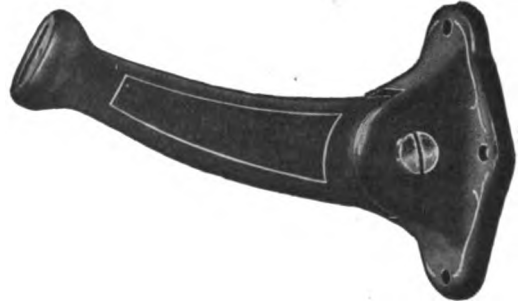
MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.

WE HELP TO MAKE

A Good
Telephone



ADDRESS 'BARRARM,' CLEVELAND

**Insulated
Electrical
Wires and Cables**

RDEBLING

**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.

TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

Agencies and Branches
**CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

ADVERTISERS' DIRECTORY—Continued**CONNECTORS.**

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., To-
ledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chi-
cago, Ill.
Electric Appliance Co., Chicago,
Ill.
Erner Hopkins Co., Columbus, O.
Farr Tel. & Const. Supply Co.,
Chicago, Ill.
Hemingray Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago,
Ill.

CORRESPONDENCE SCHOOL.

American School of Correspon-
dence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg,
Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington,
Ky.
Nagel, W. G., Electric Co., To-
ledo, O.

LATHES.

Scribner, A. C., Gloversville,
N. Y.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co.,
Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

PINS AND BRACKETS.

American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.

Central Mfg. Co., Chattanooga,
Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Prosser & Son, L., Scottsburg,
Ind.

POLES.

Beidler, Francis, & Co., Chicago,
Ill.
Bissell Co., The F., Toledo, O.
Bushnell, A., Kansas City, Mo.
Churchill, E., Heron, Mont.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City,
Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City,
Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane,
Wash.
Pendleton & Gilkey, Minneapolis,
Minn.
Pittsburg & Lake Superior Iron
Co., Escanaba, Mich.
Sand Point Cedar Co., Sand
Point, Idaho.
Sterling, W. C., & Son, Monroe,
Mich.
Valentine-Clark Co., Chicago, Ill.
Wisconsin Timber & Land Co.,
Mattoon, Wis.
Worcester, C. H., Co., Chicago,
Ill.

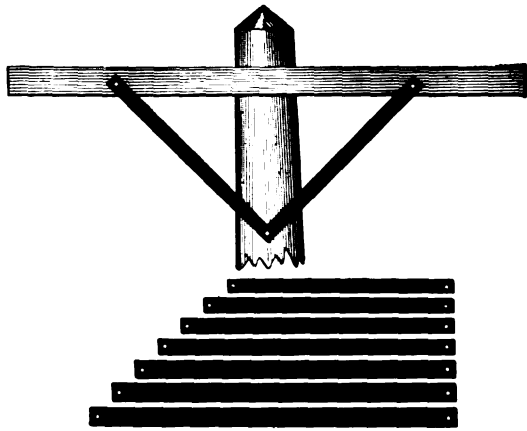
POLE STEPS.

Inland Steel Co., Chicago, Ill.

PROTECTORS.

American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.

CONTINUED ON PAGE 37.



CROSS ARM BRACES

THE STEEL MADE AND ALL THE
WORK DONE AT OUR OWN PLANT.

All Sizes

Quick Shipment

Plain and Galvanized

INLAND STEEL COMPANY

FIRST NAT'L BANK BLDG.

CHICAGO

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

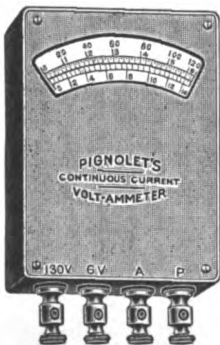
WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH

Address all correspondence to
GENERAL OFFICE:
1808 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, WIS.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,
116 NASSAU ST. CITY OF NEW YORK

Send for Sample of our

\$3.50 HOUSELINE Cable Clip

It LOOKS as good, and WHEN NEW tests nearly as well as our Standard Article and is better than many offered by irresponsible infringers of our Patent at higher prices.

Cameron Appliance Company
89 STATE STREET, BOSTON, MASS.

GEDAR POLES AND POSTS

WISCONSIN TIMBER & LAND CO., MATTOON WIS.

We have 50,000 Poles and 60,000 Posts, all sorted for immediate shipment and nothing but No. 1 stock.

Pendleton & Gilkey

816 Lumber Exchange,
Minneapolis, Minn.

POLE PRODUCERS.

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

Cost of Construction Reduced

By Purchasing Chestnut Telephone

POLES and POSTS

From FRANK MULLEN, Ewing, IND.
Reasons Why for the Asking

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

LARGE SIZES OF

CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES

For Special Use Carried in Full Stocks and Sold at Reasonable Prices

THE MEDORA MILLING CO.,
MEDORA, INDIANA

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

PINS--BRACKETS

Let us send you a few reasons why you should

BUY FROM US

L. Prosser & Son, SCOTTSBURG, INDIANA.

E. CHURCHILL

HERON, MONT.

YARDS { HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Make
a Specialty
of
Telephone
Poles.

P
O
L
E
S

Large Stock
16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES

YARDS:

Menominee, Mich.
Escanaba, " "
Cloquet, " "
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

E
S

FRANCIS
BEIDLER
& CO.
459-519 W. 22d St.
CHICAGO, ILL.

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American
Telephone Journal

116 Nassau Street,
New York City.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART, oaks, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly. R. R. Ames, Manager.

LEWIS LUMBER & MFG. CO., Mattiesburg, Miss.

Blank Books and Forms**FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.** ❖ ❖ ❖

Toll Tickets	Receipts for Toll Service
Toll Station Journals	Receipts for Exchange
Toll Station Ledgers	Service
Monthly Check Reports	Lease Records
	Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEFIANCE, OHIO**CYPRESS POLES** Creosoted and Treated with Chloride of Zinc

IF YOU WANT a telegraph pole THAT WILL OUTLAST ANY TWO CEDAR POLES, get the above. No decay. No dry rot. Nothing to give way. Test poles SOUND AFTER THIRTY YEARS. Price on long lengths same as cedar. Short lengths about one-third higher. Address

A. BUSHNELL, 903 Broadway, KANSAS CITY, MO.**The Erner Hopkins Co.** Wholesale Electrical Supplies

WRITE US FOR PRICES.

WE CAN SAVE YOU MONEY.

The ERNER HOPKINS CO., COLUMBUS, OHIO.**LE ROY W. STANTON**
Consulting Telephone EngineerPlans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.**The James A. Spargo Wire Co.**

Manufacturers of BARE and TINNED

COPPER WIRE

Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.

ROME, N. Y.Chicago Office: 1501 Monadnock Bldg.,
CHICAGO.**BUTTERFIELD, J. F.****ELECTRICAL ENGINEER
AND CONTRACTOR** :: ::Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.**Keeling & Ridge Co.****General Contractors**


Builders of Telephone and Telegraph Lines, Electric Railroad, Power Lines, etc. Conduit Work a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

Do you always mention the

American Telephone Journal
when writing to advertisers? It will be appreciated by all concerned if you do.**THE IMPERIAL FINANCE & CONSTRUCTION CO.****CAPITAL. \$250,000.00.****Main Offices: 851-2-3 The Spitzer, TOLEDO, OHIO.****GENERAL CONTRACTORS**

Telephone propositions financed, engineering estimates and reports promptly furnished.



J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

**WESTON STANDARD
PORTABLE
DIRECT READING**Voltsmeters, Ammeters, Millivoltmeters, Voltammeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.**Weston Electrical Instrument Co.,**
Waverly Park, NEWARK, N. J.BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS FRANCE—E. H. Cadot, 11 Rue St. Georges.

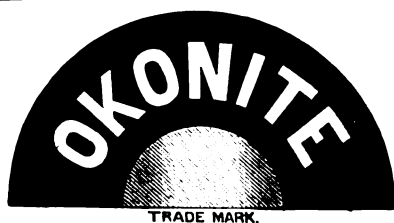
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Do you always mention the
**American
Telephone
Journal**when writing to advertisers?
It will be appreciated by all
concerned if you do.**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.**MATHIAS KLEIN & SONS**
87 West Van Buren St., CHICAGO, ILL.

1889—Paris Exposition Medal for Rubber Insulation

1893—World's Fair Medal for Rubber Insulation

The Standard for Rubber Insulation
Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., Sole Manufacturers, 253 BROADWAY, NEW YORKWILLARD L. CANDEE, {
H. DURANT CHEEVER, { ManagersGEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices : NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

THE NORTH-WESTERN LINE

California

3 DAILY TRAINS.

THE OVERLAND LIMITED—Electric-lighted daily train. Less than three days Chicago to the Coast. Compartment and standard sleeping cars, dining and observation cars; barber, bath, buffet, library.

THE PACIFIC EXPRESS—Pullman drawing-room and tourist sleeping cars, dining, buffet, library and free reclining chair cars.

THE CALIFORNIA EXPRESS—Daily and personally conducted tourist excursions to San Francisco and Los Angeles. Tourist and drawing-room sleeping cars, free reclining chair cars and dining cars.

Oregon

Two daily trains Chicago to Portland. Drawing-room sleeping cars; buffet, library, dining cars; barber and bath. Tourist daily and personally conducted excursions.

Colorado

Three daily trains from Chicago. Colorado Special, only one night Chicago to Denver. Personally conducted tours Chicago to Colorado without change.

All ticket agents sell tickets via The North-Western Line.

W. B. KNISKERN,
Passenger Traffic Manager,
Chicago.

To Upper Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway.

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,

General Passenger Agent,

CHICAGO, ILL.

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.



P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*



*Single or
Multiple Duct.*

**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S
(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

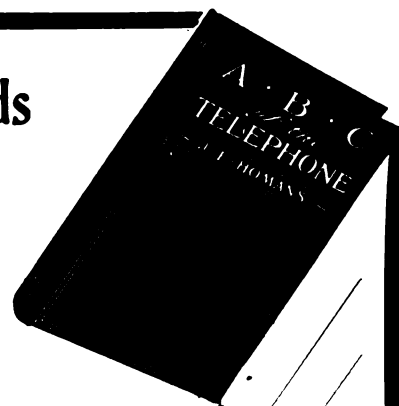
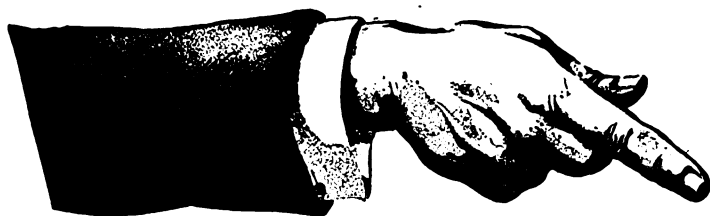
Fused Wire,
Fused Links
and
Strips.

Two Things Every Telephone Man Needs

They are the American Telephone Journal (published weekly), a year's subscription for \$1.00, and a copy of the new and revised edition of "The A. B. C. of the Telephone"; a practical book for telephone men.

This new edition has been brought thoroughly up-to-date, and sells for \$1.00. By a special arrangement we will send a copy of the "A. B. C." and give a year's subscription to the American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____ State _____

American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send me a copy of the Revised "A. B. C." and a year's subscription to the Journal.

ADVERTISERS' DIRECTORY—Concluded

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.
Chicago, Burlington & Quincy Ry. Co.

SEALS.
Middleton & Co., J. W., Chicago, Ill.

STATIONERY.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.
National Battery Co., N. Y. City.

SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.

American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Telephone Apparatus Exchange, Chicago, Ill.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
De Veau Telephone Mfg. Co., New York.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BLANKS.
Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.
Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Telephone Apparatus Exchange, Chicago, Ill.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
De Veau Telephone Mfg. Co., New York.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C. Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

TOLL TICKETS.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebing's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburgh, Pa.

WOOD PRESERVER.
Bruno Grosche & Co., New York.
Bushnell, A., Kansas City, Mo.



Experience
is a wise teacher

We were taught in
that school.

G. M. GEST
EXPERT ELECTRICAL SUBWAY CONTRACTOR

Union Trust Bldg., Cincinnati 277 Broadway, New York City

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

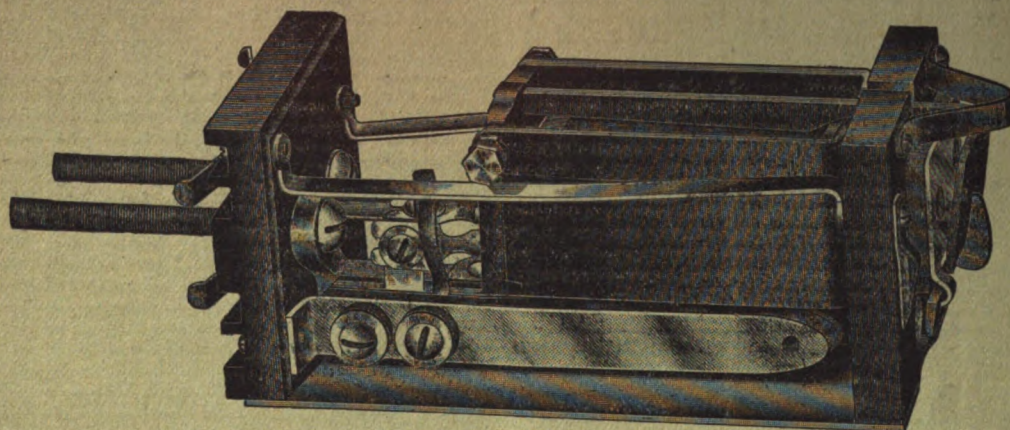
Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

**170 Broadway
NEW YORK**

IMPROVED AMERICAN EXPRESS SWITCHBOARDS BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

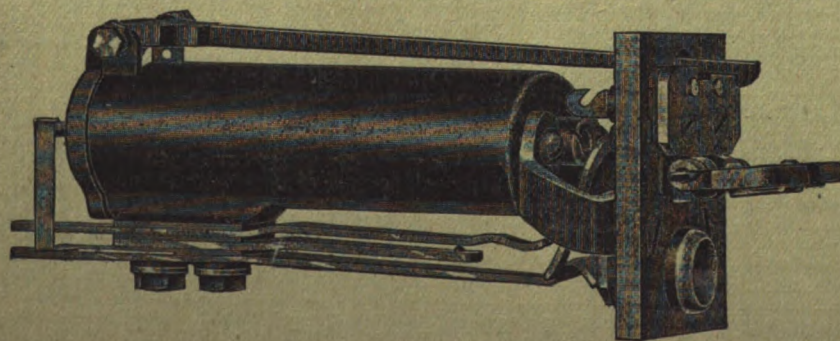
SELF-CONTAINED DROPS AND JACKS RAPID RINGING DEVICE

All drops restored to normal position by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10.



AT
POPULAR
PRICES

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

THE AMERICAN TELEPHONE JOURNAL

Have You a "Follow-up"?

Do you send a prospective customer a short letter and a catalogue and price list, on receiving an inquiry, and then sit down and wait for his order? Or do you persistently "follow up" with letters, circulars, samples, concentrating all your efforts in an attempt to win his trade?

If you do no more than the former, it is more than likely your business competitors get the lion's share of trade.

It is the same in advertising. You have got to "follow up." One ad won't get a customer. Maybe a dozen ads won't. But there is no doubt that judicious and persistent advertising will win new customers and new trade. You want to select the best medium, and then write copy that will pull.

For reaching the telephone trade, there is no better paper than THE AMERICAN TELEPHONE JOURNAL. It is the only weekly in the field, enabling you to appeal to the buyer 52 times a year.

It has a larger circulation than all other telephone papers combined. And its circulation is "quality circulation"—every subscriber is a buyer. This is so because its readers are men of importance in the telephone field, being attracted by the high class of the editorial contents.

Edited by **WILLIAM HENRY McDONOUGH**

Volume 9 NEW YORK—JUNE 11, 1904—CHICAGO Number 24

PUBLISHED WEEKLY

ONE DOLLAR A YEAR

Advertisers' Directory, Page 9

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

MILITARY LINE WORKBy Edward A. Tyler
THE QUESTION OF ELECTROLYSIS.....By A. V. Abbott
AN AUTOMATIC PRIVATE LINE EXTENSION.....By W. C. Kessell
HINTS ON THE CARE OF TELEPHONE STORAGE BATTERY PLANTS, Article 2.....By Charles D. Spencer
ELECTRICAL INDUSTRIES FROM THE CENSUS STANDPOINT.....
OHIO INDEPENDENT TELEPHONE ASSOCIATION MEETING

The Operating Field:

THE EVANSVILLE (IND.) HOME COMPANY APPLIES FOR A FRANCHISE	THE TELEPHONE IN LONDON
CENTRAL UNION (BELL) REDUCES RATES	DEMAND FOR ELECTRICIANS IN THE ARMY
THE GROCERS AT INDEPENDENCE, MO., REVOLT	INDEPENDENT LONG DISTANCE CONSTRUCTION
NEW ENGLAND INDEPENDENT COMPANY FIGHTS BELL	WEATHER FORECASTS BY TELEPHONE
THE VOUGHT-BERGER COMPANY'S PLANT DAMAGED BY FIRE	
WIRELESS TELEPHONY AT ST. LOUIS	A BATTERY TEST SET, by Otis J. Dorwin
PITTSBURGH AND ALLEGHENY TELEPHONE COMPANY NEWS	
QUERIES	PATENTS.
THE WEEK'S MESSAGES	THE EDITOR'S PAGE
WANT AND FOR SALE ADVERTISEMENTS, PAGE 384	TRADE NOTES

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

The Test in Actual Use

is the real test. Our devices have stood this test.

HERE IS CONCLUSIVE EVIDENCE:

We have about 275 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first-class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

CEDAR RAPIDS & MARION TELEPHONE CO.
(Signed) W. H. DURIN, Sec. & Treas.

The Lincoln (Neb.) Telephone Co. is installing its complete plant with between 300 and 400 of our novelty devices.

The Sioux City (Iowa) Telephone Co. will be similarly equipped.

Write NOW for Samples, Description and
Prices, giving diameter of your cables.

New Haven Novelty Machine Co.

Elm & State Sts., New Haven, Conn.

"SPECIAL" Telephone Condensers

The "Special" Condensers are of standard design, and are superior, due to their absolute uniform capacity and ability to stand high voltage without break down.

They are of high insulation resistance.

The "Special" is made to withstand a voltage of 250 volts alternating current indefinitely, without injury or leaking appreciably. The insulation resistance is forty meg-ohms per microfarad, and the greatest variation in capacity will not be over 5 per cent. of the rated capacity.

The "Special" Condenser is neatly and hermetically sealed in metal cases mounted with hard rubber terminals, and tinned brass terminal lugs.

For full information regarding Condensers and about everything else in the telephone line you should have our General Telephone Catalogue No. 19, and Telephone Parts Catalogue No. 21.

Electric Appliance Company,

Telephone Manufacturers.

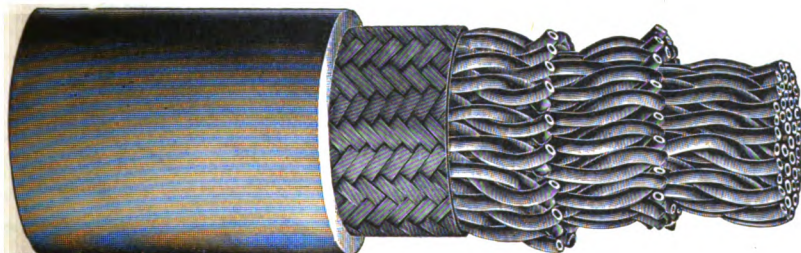
Electrical Supplies.

92 and 94 W. VAN BUREN ST.,

CHICAGO.

WRITE FOR SAMPLE CARD OF WIRES.

Manufacturers of



"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::

INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.

SUBSCRIPTION BLANK

Out this out and enclose
with a Postoffice or Express
Money Order or A DOLLAR
BILL, at our risk.

American Telephone Journal
116 Nassau St., NEW YORK

.....1904

Enclosed find.....for One Dollar (\$1.00)
Subscription for One Year.

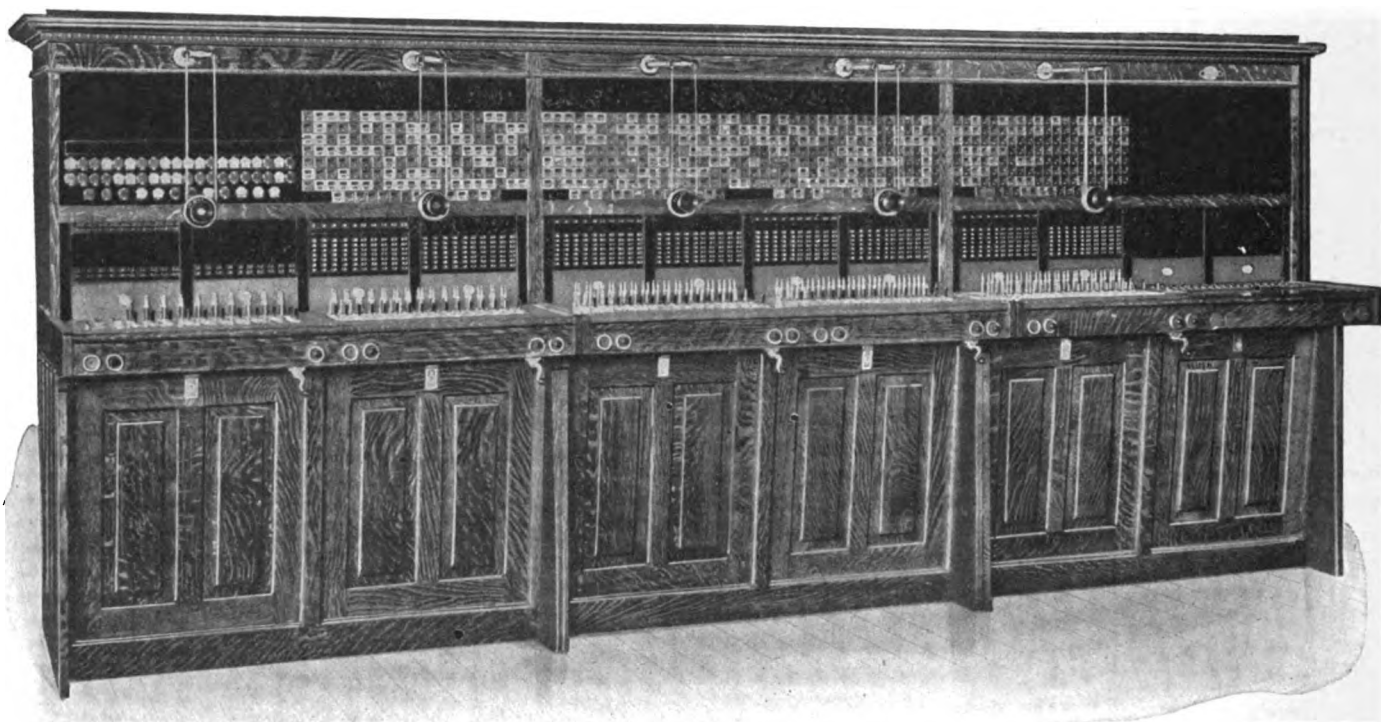
Name.....

P. O. Address.....

Generator Call Visual Signals

We made this type of equipment popular by manufacturing a signal that is simple, reliable and easy to install

A 50-line exchange can with this type of equipment give as rapid service as would be required of an exchange ten times as large



The above board was installed in Missouri

It is equipped with Generator Call Visual Signals

There's lots of satisfaction in operating one of these switchboards

It gives rapid service--reduces operating expenses

THE BEST RECOMMENDATION IS THE USER

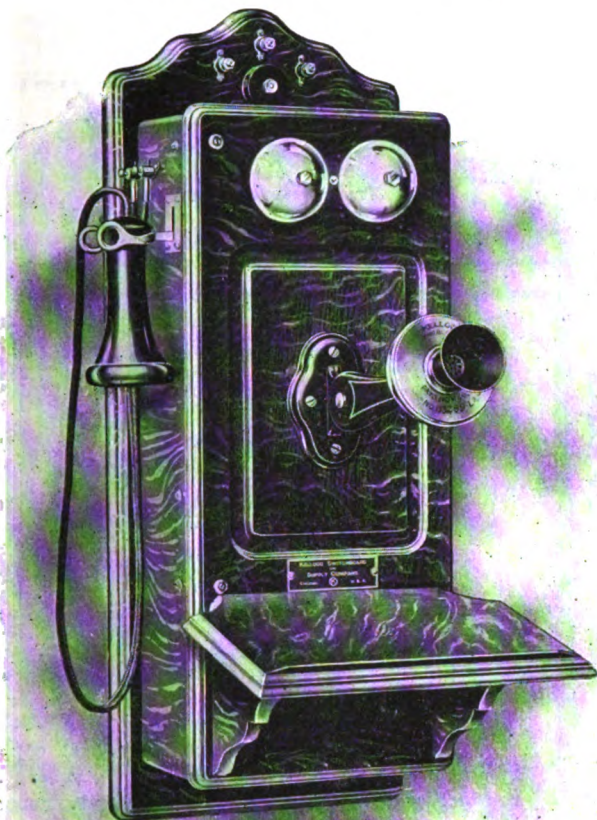
DESCRIPTIVE PRINTED MATTER MAILED UPON REQUEST

Stromberg-Carlson Tel. Mfg. Co.

**GEN'L & AND EASTERN SALES OFFICE
ROCHESTER, N. Y.**

**SALES DEPT.
CHICAGO, ILL.**

Kellogg Magneto Telephones



ARE ENTIRELY UNLIKE ANY
OTHER MAKE OF
TELEPHONE

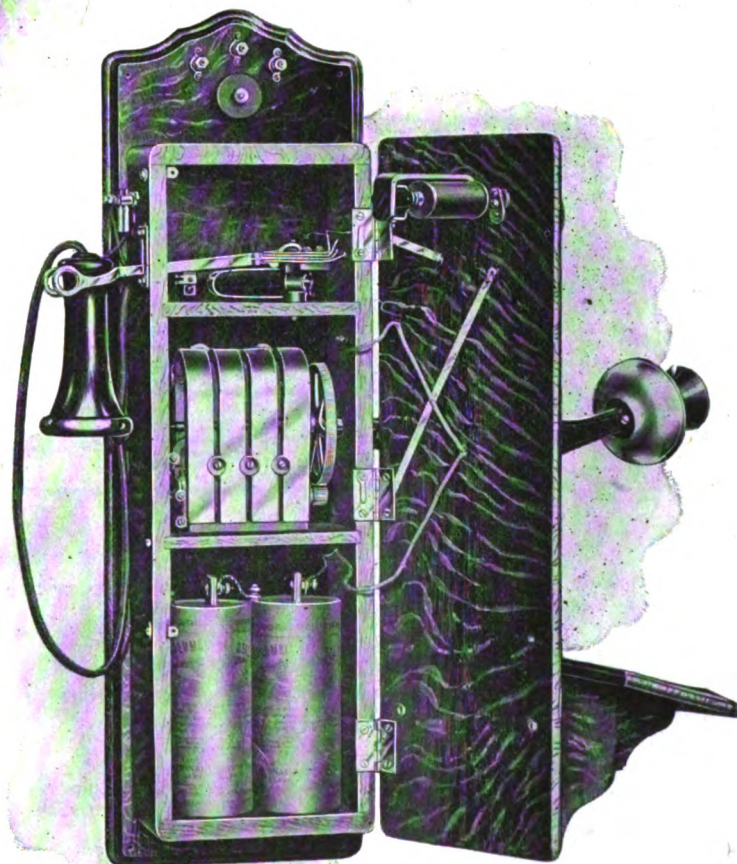
*They are remarkably
durable, compact and
of handsome design.*

*They are equipped
with the Kellogg
standard transmitter,
receiver, switch-hook
and ringer.*

**Kellogg Switchboard
and Supply Company**

GREEN AND CONGRESS STS., CHICAGO

Electric Building Cleveland
Keystone Telephone Building, Philadelphia



HIPWELL MANUFACTURING COMPANY, ALLEGHENY, PA. High Grade Long Distance Telephones



**FARMERS' TELEPHONES
AND TELEPHONE SUPPLIES**
LINEMEN TOOLS, BATTERIES, WIRE, BRACKETS, PINS,
CROSS-ARMS, BRACES, LAG BOLTS.
Quick Shipments. Prices are Right.
HIGH GRADE TELEPHONES AND SWITCHBOARDS.

FARR TELEPHONE & CONST. SUPPLY CO., CHICAGO.



Exchange Telephones
and Private Line Telephones,
Express Switchboards, Gong
Switchboards, Large or Small
Transmitters, Receivers and
Hooks.

A set of Bookkeeping Blanks and Ledgers Free with a \$10.00 Order.



One Word Please



Do you know that
you can buy this

**Compact
Magneto**
and assemble a very
**High-Grade
Telephone**

at a reasonable cost.

☐ Pure platinum con-
tacts on both ringing
and talking circuits. ☐ Equip-
ped with those H-C genera-
tors and ringers. Write us.

The Holtzer-Cabot Electric Co.

Brookline, Mass. : : : : : Chicago, Ill.

F. B. CO.
Famous Green and Black Duplex



"BULL FROG BRAND"

WE are the originators of the Green and Black Duplex.
We make this of the very best copper wired
insulated with an extra quality of rubber, and each
conductor covered with a very closely woven braid
saturated with paraffine, one conductor black and the
other green. This is the very best wire made for inter-
ior telephone wiring.

"One of our 61 Varieties"

We have at Toledo one of the largest wire stocks in
the United States.

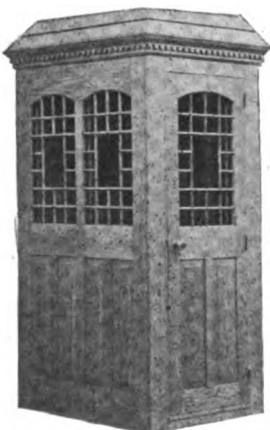
THE F. BISSELL COMPANY

Manufacturers and Jobbers of

TELEPHONE SUPPLIES

226-228-230 HURON STREET

TOLEDO, O.



The Exclusiveness of the Booth appeals to all people.
That's one reason why they are good money makers for
exchanges.

Desirable Booths are built on graceful lines and give
absolute privacy of conversation. The wise manager
installs them generously.

CATALOGUE ON REQUEST.

YESBERA MFG. COMPANY
TOLEDO, OHIO





Reasons

1. *Good material.*
2. *Skilled workmanship.*
3. *Careful inspection.*

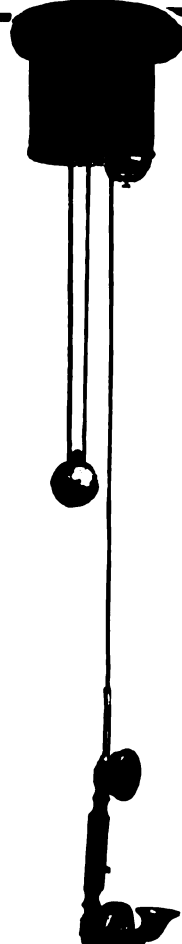
And most important.

4. *An Honest Endeavor to produce the best.*

In Eastern Telephones you get all these.

WRITE US

Eastern Telephone Mfg. Co.
WEST CHESTER, PA.



In Spite of His Predilection! Kismet!

GENTLEMEN:
"In regard to the PENDENT TELEPHONE you shipped us, would advise you that we placed that 'phone in the 'Frisco depot at this place as soon as it arrived. We had a desk set there before and it got out of order, so we told them that we would put the PENDENT in until we could repair the other one, and they said all right, if we would be sure and put the desk set back again. We repaired it the other day and asked the agent if he wanted it put in again. *He said no, he would not give up the PENDENT for any 'phone he had ever seen;* and I want to say that it hasn't given us a minute's trouble since we have had it. In other words, we are more than pleased with it."

Yours very respectfully,
FRANK E. BEEMAN, Secretary,
B. M. & R. Telephone Company,
Wellston, Oklahoma.

Given the opportunity

The Pendent Telephone

invariably overcomes skepticism or prejudice.

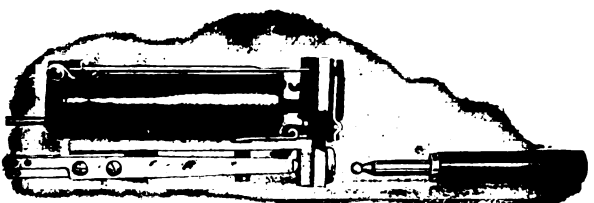
Give it the opportunity—send for and try one.

THE VOUGHT-BERGER CO.,
MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS AND APPLIANCES.
La Crosse, Wis.

IN THE "International" SWITCHBOARD

the automatic restoration of the drop is "*Accomplished by means dissimilar to the contact of the plug with the drop as the plug enters the jack.*"

(See the decision)



It Don't Infringe

"International" drop fully protected by patents allowed, and **Guaranteed Absolutely Non-Infringing**

A SAMPLE

will convince you that it is electrically and mechanically perfect

International Telephone Mfg. Co.
Harrison and Clinton Streets, Chicago, U. S. A.

Couch No. 32 Transmitter

UNSURPASSED



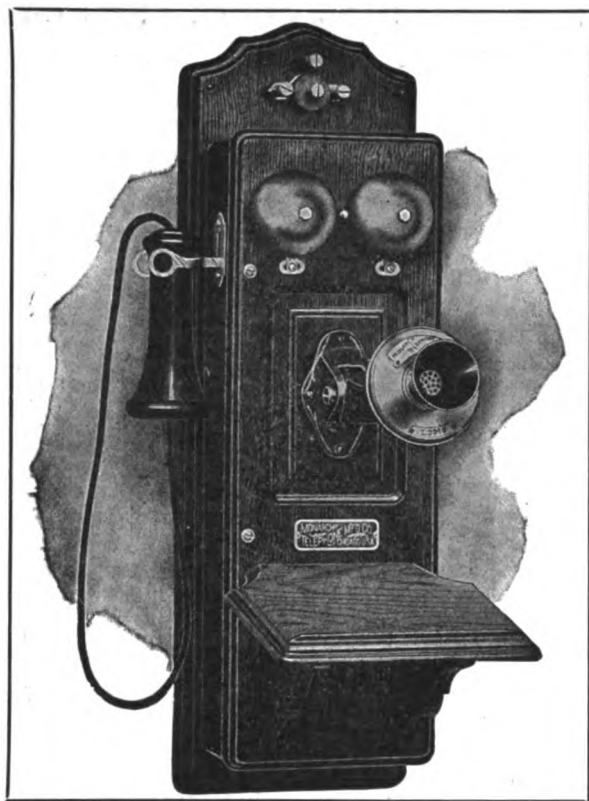
Being No. 30 Mounted on No. 320 Adjustable Arm with Induction Coil in Base.

In a Class by Itself

Has been made the same way for years, never necessitating any change.

Get a sample and play ball with it, or drop it out of the window, then note how well it will talk.

S. H. COUCH CO.
162 Pearl St. Boston, Mass.



That all

Monarch Apparatus

is conscientiously made is a well known fact.

That all

Monarch Apparatus

will give lasting and satisfactory service can be proven by a trial.

That all

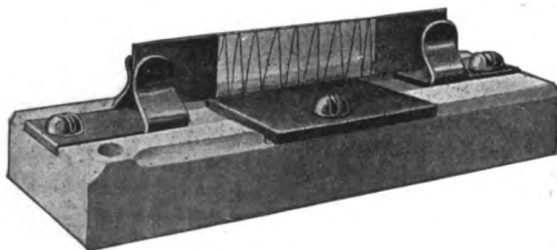
Monarch Apparatus

is reasonable in price considering the quality can be learned by writing for our prices.

A full description of Monarch products will be found in our new catalogue, sent free upon request

**Monarch Telephone
Mfg. Co.** 14 SO. CLINTON STREET
CHICAGO, ILL.

OUR PROTECTORS PROTECT



Our **Protector Line** includes Cable Terminal Heads, Distributing Boards, Cross Connecting Boards and Fuse Blocks.

We manufacture Full Line Telephone Apparatus. We supply "Everything Used With Telephones." Catalogues and Sample Fuse Block free to anyone mentioning this ad.

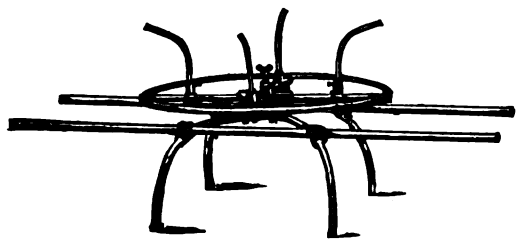
Central Telephone & Electric Co.

909 Market Street

ST. LOUIS, U. S. A.

"READY" PAY OUT REELS

Pat. June 13, July 27, Oct. 23, 1903.



Before buying construction tools write us for prices and descriptive matter. "Ready" Reels are made in ten styles, all Iron, Cone Bearings, Light and Strong. "Ready" Reels are handled by All Jobbers.

1900 Dry Batteries

The 1900 Dry Battery is an ideal Dry Battery for telephone use. Each Battery is guaranteed by the manufacturer, has long life, High Electromotive force, and large amperage.

A trial order will convince.

The W. G. Nagel Electric Co.

Toledo, O.



ADVERTISERS' DIRECTORY

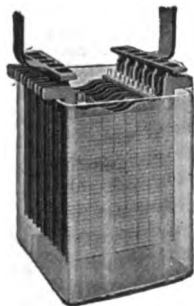
American Conduit Co.	36	Camp, The H. B. Co.	39
American Electric Teleph. Co.	40	Central Mfg. Co.	30
Am. School of Correspondence	—	Central Telephone & Electric Co.	8
American Vitrified Conduit Co.	39	Century Telephone Const. Co.	11
Automatic Electric Co.	34	Chicago, Burlington & Quincy Ry.	—
Barr, W. J., Mfg. Co.	31	Co.	35
Beidler, Francis & Co.	33	Chicago Insulated Wire Co.	34
Benedict & Burnham Brass & Cop- per Co.	30	Chicago Writing Machine Co.	—
Bissell Co., The F.	6	Churchill, E.	33
Bruno Grosche & Co.	12	Cohn & Bock	33
Bullard & McElligott	10	Columbia Mfg. Co.	33
Bushnell, A.	33	Connecticut Teleph. & Electric Co.	—
Butterfield, J. F.	34	Cook, Frank B.	37
Cameron Appliance Co.	—	Couch, S. H., Co.	7
		Crumb, W. H., Co.	36

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

De Veau Tel. Mfg. Co.	—	Kellogg Switchboard & Supply	5
Dickey Clay Mfg. Co., W. S.	36	Co.	12
Eastern Telephone Mfg. Co.	7	Lanz, M., & Sons	33
Electric Appliance Co.	3	Lewis Lumber & Mfg. Co.	32
Electric Railway Equipment Co.	35	Lindsley Bros. Co.	36
Ericsson Telephone Co.	10	McIntire, C., Co.	29
Erner Hopkins Co.	34	Maltby Lumber Co.	33
Fahnestock Transmitter Co.	6	Medora Milling Co.	31
Farr Tel. & Const. Supply Co.	29	Merritt & Co.	33
Fowler, John H.	11	Michigan Cedar Co.	8
Garton-Daniels Co.	38	Middleton, J. W., & Co.	33
Gest, G. M.	32	Monarch Telephone Mfg. Co.	3
Guarantee Telephone & Equipment	32	Mountain State Electric Co.	33
Co.	10	Mullen, Frank	9
Hart & Co.	6	Munk, Otto	9
Hemingray Glass Co.	6	Nagel, W. G., Electric Co.	9
Hipwell Mfg. Co.	6	National Battery Co.	10
Holtzer-Cabot Electric Co.	34	National Telephone Supply Co.	35
Imperial Finance & Cons Co.	34	National Wire Corporation	2
Indiana Rubber & Insulated Wire	3	New Haven Novelty Machine Co.	—
Co.	32	Nungesser Electric Battery Co.	—
Index of the Technical Press	32	Okonite Company	30
Inland Steel Co.	32	Pacific Coast Pole Co.	33
International Telephone Mfg. Co.	34	Pendleton & Gilkey	32
Keeling & Ridge Co.	34	Pignolet, L. M.	32
Klein, Mathias, & Sons	34	Pittsburg Lake Superior Iron Co.	29

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



STORAGE BATTERIES

UP-TO-
DATE

TELEPHONE BATTERIES MUST HAVE

HIGH CAPACITY

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

CONSTANT CURRENT FLOW

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.

SWITCHBOARD CORDS

FOR single and metallic circuit.
That will outlast three of
other makes.

The steel spiral is tough and
flexible, and it's impossible to break
it.

It's covered with the best linen
thread, woven by our special process
and made in six colors: red, blue,
green, yellow, brown and drab.

Write today for sample and price.

ERICSSON TELEPHONE CO.

Manufacturers of

SWITCHBOARDS, TELEPHONES and TELEPHONE SUPPLIES
296 BROADWAY - - NEW YORK

Prosser & Son, L.....	33	Chicago Insulated Wire Co., Chi-	
Roebbing's, John A., Sons Co.....	31	cago, Ill.	
Sand Point Cedar Co.....	30	Kellogg Switchboard & Supply	
Scovill Mfg. Co.....	2	Co., Chicago, Ill.	
Scribner, A. C.....	11	Nagel, W. G., Electric Co., To-	
Seaman, W. S., & Co.....	12	ledo, O.	
Spargo, James A., Wire Co.....	34	National Wire Corporation, New	
Standard Underground Cable Co.....	—	Haven, Conn.	
Standard Vitrified Conduit Co.....	36	Okonite Co., New York.	
Stanton, L. W.....	34	Roebbing's Sons Co., John A.,	
Sterling, W. C., & Son.....	33	Trenton, N. J.	
Sterling Electric Co.....	11	Standard Underground Cable Co.,	
Stromberg-Carlson Telephone Mfg.		Pittsburg, Pa.	
Co.....	4	Stromberg-Carlson Tel. Mfg. Co.,	
Swedish-American Tel. Co.....	12	Chicago, Ill.	
Telephone Printing Co.....	33		
Valentine Clark Co.....	30	CABLE HANGERS.	
Vought-Berger Co.....	7	Bissell Co., The F., Toledo, O.	
Wanted, Situations, etc.....	384	Bullard & McElligott, Pittsburg,	
Weston Electrical Instrument Co.	34	Pa.	
Worcester, C. H., Co.....	29	Cook, Frank B., Chicago, Ill.	
Yesbera Mfg. Co.....	6	Nagel, W. G., Electric Co., To-	

ATTORNEYS.

Munk, Otto, New York City.

BATTERIES.

Electric Appliance Co., Chicago,

Ill.

Mungesser Electric Battery Co.,

Cleveland, O.

Stromberg-Carlson Tel. Mfg. Co.,

Chicago, Ill.

BLANKS, BOOKS AND FORMS.

Telephone Printing Co., Defiance,

Ohio.

BONDS.

J. W. Middleton & Co., Chicago,

Ill.

BRASS.

Benedict & Burnham Brass & Cop-

per Co., Chicago, Ill.

Scovill Mfg. Co., Chicago, Ill.

BOOTHES.

Yesbera Mfg. Co., Toledo, O.

CABLE CLIP.

Bullard & McElligott, Pittsburgh,

Pa.

National Tel. Supply Co., Cleve-

land, O.

CABLES.

American Electric Tel. Co., Chi-

cago, Ill.

Bissell Co., The F., Toledo, O.

CONTINUED ON PAGE 31.

CABLE SLEEVES.

Nagel, W. G., Electric Co., To-

ledo, O.

New Haven Novelty Machine Co.,

New Haven, Conn.

CARD INDEX SYSTEMS.

Telephone Printing Co., Defiance,

Ohio.

CIRCUIT CLOSERS.

Garton-Daniels Co., Kookuk, Ia.

CLIMBERS.

Klein & Sons, Mathias, Chicago,

Ill.

Nagel, W. G., Electric Co., To-

ledo, O.

CONDUITS.

American Conduit Co., Chicago,

Ill.

American Vitrified Conduit Co.,

New York.

Camp Co., The H. B., New York.

Gest, G. M., Cincinnati, O.

Nagel, W. G., Electric Co., To-

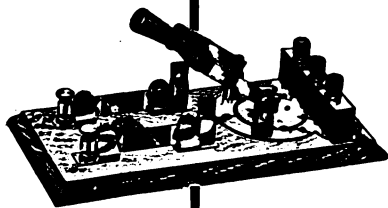
ledo, O.

Standard Vitrified Conduit Co.,

New York.

W. S. Dickey Clay Mfg. Co.,

Kansas City, Mo.



The New "TORNQUIST" Combination Lightning Arrester
GROUND SWITCH, FUSE AND LEVER CUT-OUT

King of Protectors

THE GREATEST SUCCESS IN THE TELEPHONE FIELD

BETTER PRICES

BETTER PROTECTION

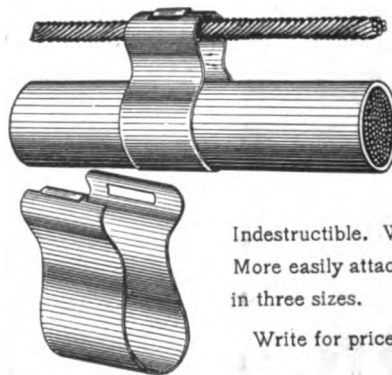
Write for Sample

HART & CO., Monadnock Bldg., Chicago

MARLIN CABLE HANGERS



NATIONAL
TELEPHONE
SUPPLY CO.
CLEVELAND



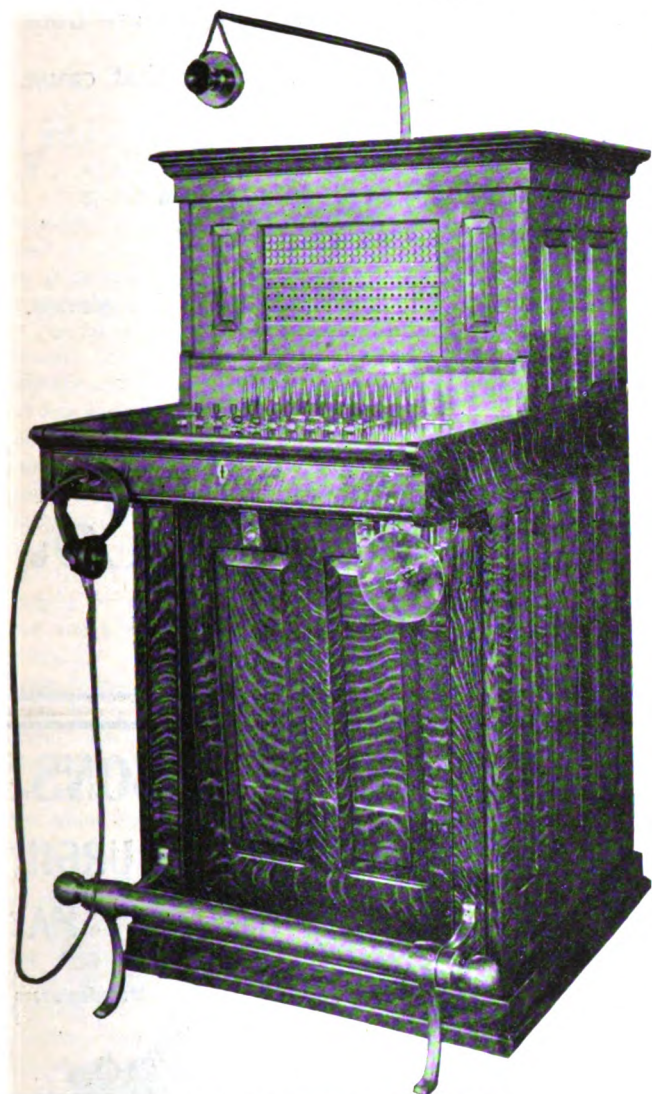
The Pittsburgh Cable Clip

Indestructible. Will not slip on or cut cable.
More easily attached than any other. Made
in three sizes.

Write for prices and particulars.

BULLARD & McELIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.

OUR MOTTO
"Standards of Standards"
ALL WE ASK IS
A COMPARISON



100 LINE LAMP SIGNAL MAGNETO BOARD.

Our
LAMP SIGNAL
MAGNETO SWITCH BOARD

With all its latest improvements

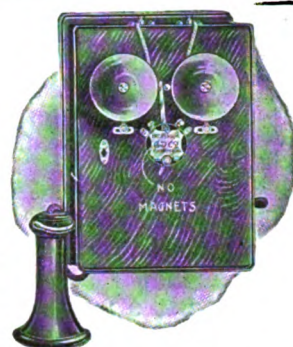
Can Not Be Equalled

Write us for information

Sterling Electric Co.
LAFAYETTE, IND.

**Take
*A Drop***

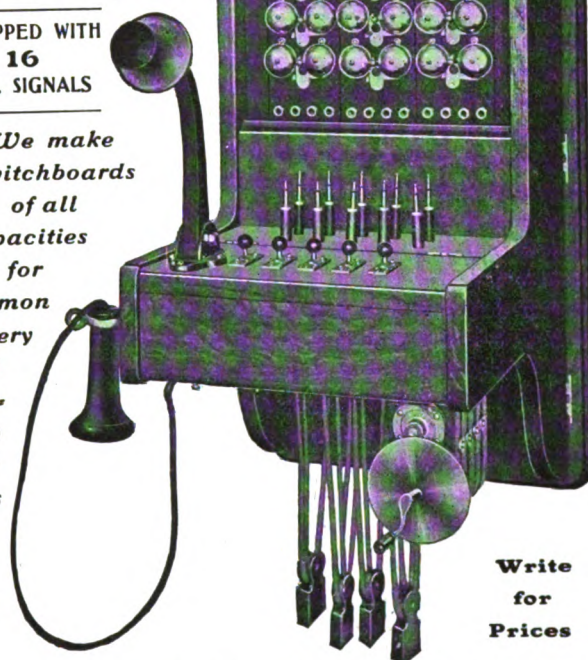
Put a G. D. Extension Drop on one of your phones. Watch it work for a month. You'll want more of them. Send for sample and pamphlet D6.

**GARTON-DANIELS CO., Keokuk, Iowa****The Century**

Type 6 A

**SWITCHBOARD
FOR
RURAL LINES**EQUIPPED WITH
16
BELL SIGNALS

*We make
Switchboards
of all
Capacities
for
Common
Battery
and
Mag-
neto
Sys-
tems*

Write
for
Prices

CENTURY TELEPHONE CONSTRUCTION COMPANY
536 Ellicott Square, BUFFALO, N. Y.

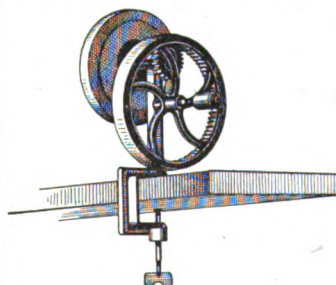
The Little Gem Grinder**A HANDY TOOL
FOR EVERYBODY**

Has a 5x3-4 inch Emery Wheel.

A valuable adjunct to telephone exchanges, repair shops, butchers, restaurants, hotels, tinsmiths and plumbers.

Net Price, \$2.25

Liberal Discount to Agents.



A. C. SCRIBNER, Manufacturer,
GLOVERSVILLE, NEW YORK.

In the Life of a Telephone Lies the **PROFIT THEREOF**

How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO

A Sound Proof Telephone Booth doubles the revenue



of public stations in Cities, Towns, and Villages by ensuring privacy and quietude to telephone users.

To demonstrate this fact we offer special inducements to new customers for any orders for Booths received in response to this advertisement.

Catalogue with Prices mailed on Application.

W. S. Seaman & Co.
216 East Water St., Milwaukee, Wis.

M. LANZ & SONS,
PITTSBURGH,
PA.

PLAIN
AND
GALVANIZED

Telephone and
Telegraph Line Material

Manufacturers of

Poles That Don't Rot

at the base and where Crossarms are fastened to them can be made at a trifling expense out of any stick by treatment with **S. P. F. Carbolineum**. 25 years' record. For particulars address

BRUNO GROSCHÉ & CO.,
27 William St., New York.

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JUNE 11, 1904

NUMBER 24

MILITARY LINE WORK

BY EDWARD A. TYLER.

VON MOLTKE has well said that "War is the only science which lays under tribute all other sciences." In this respect telephony is rapidly coming to the front as a most valuable aid to modern military campaigning. It is not the purpose of this article to outline the general uses of the telephone as an adjunct to the signal corps but to illustrate the construction of field lines by the linemen.

The introduction of the telephone into the service, in a sense of general utility, occurred as a result of the experiences of the regular and volunteer signal corps in Cuba in 1898. As the work of line construction is in many respects of a common-place character, and because the membership of this branch of the National Guard consisted largely of men without any electrical training, and who were engaged in pursuits foreign to electrical work of any description, the enthusiasm necessary for good results was lacking.

Owing to the efforts of Corporal M. C. Sullivan to make the electrical department of the Signal Service practical and efficient, and to create an interest in the work, climbing competitions were originated, which proved such great incentives that a tournament was arranged under the auspices of the Military Athletic League of North America between the First and Second Signal Corps of the New York National Guard.

The event took place at Madison Square Garden, New York City, during the week ending March 31st, 1900. The articles of agreement governing the contest were as follows:

"On the dates assigned for the contest the Military Athletic League will furnish six poles, as nearly uniform as possible, erected rigidly, in a vertical position, each pole having a spike driven in one side at a point thirty feet from the base, the spike to protrude about five inches; also two sets of cards, numbered from one to twenty, each supplied with a loop of string or wire of a sufficient size to be slipped over a man's head. The poles are to be arranged in two rows, three in each row, at opposite sides of the arena, and the numbered cards placed on a table in the center of the arena, in two piles, with the lowest number at the top in each.

"The contest shall consist in placing the numbered cards above

referred to on the spikes on the poles, under the following conditions:

"Each corps shall be represented by a team of six enlisted men, who have been members of their respective organizations at least two months, and whose daily employment does not include pole climbing, or have been in the past employed as professional linemen.

"The contest shall be of three heats of three minutes each, and the team winning two heats shall win the contest and be awarded the trophy. One heat to take place on Tuesday night, March 27th,

and the other or others on Saturday night, March 31st.

"At the signal to start the contestants shall take the numbered cards from the table, one at a time, and place them on the spikes on the poles of their respective teams, climbing the poles for the purpose and descending to the ground each time a card is so placed, no contestant to have at any time more than one card in his possession and not more than one contestant to be on a pole at a time under penalty of being ruled out.

"At the signal to stop, the team having the greater number of cards hanging from the spikes

on the poles shall be the winner of the heat."

From a spectacular point of view the pole-climbing contest was by far the most enthusiastically received of any of the events of the tournament, and the success of the ruse to create an interest in a most ordinary phase of work was shown by the number of applicants for "honors" of a climber. In August of that year, at the Interstate Military Tournament, held at West End, N. J., an elaborate gold medal, of which a picture is shown, was offered for competition.

Since then the work has progressed rapidly, and to-day there are members of the National Guard who in the business world are holding high positions that can buckle on a pair of climbers and do as rapid and efficient work as can their brothers the linemen of the telephone companies. The construction of a line during a campaign is surrounded with difficulties. In the first place, there have to be improvised supports from any material which may be on hand, such as trees, and where the span is too long between available supports branches are cut down and utilized to



Fig. 1. Building a Line Through Difficult Country.

make temporary supports. Then there are the telephones themselves, which have to stand harder wear under these conditions than is ever given them in any other usage.

Unfortunately, the idea seems to be common that anyone can handle a telephone, and in consequence if anything goes wrong the instrument is condemned. This is particularly noticeable when one considers the amount of time and thought that is given to the training of men in the use of all other military appliances, many of which are nowhere near as complicated or as difficult to understand. It is to be hoped that the powers that be will give this their attention, and then the telephone will hold a position second to none in its usefulness to the Signal Corps. The illustration is from a photograph taken during an actual campaign, and shows the method of construction when the opportunity offers. As an

instance to show the rapidity of constructing a line under these conditions, a scouting party at one of the manoeuvres built a line three miles in length through difficult country in a little over one hour, and this line was in use for ten days under conditions exactly the same as would occur in a regular campaign.

The chief signal officer's report of that branch of the service in the Spanish-American war deals largely with the superiority of electrical signaling over the visual method. In fact, the latter method had to be abandoned for land work. During the Santiago, Puerto Rico and Manila campaigns lines were strung along the roadside and across country for miles, thus maintaining instantaneous communication between all divisions without regard to distance so necessary to successful military operations, especially in unknown country

THE QUESTION OF ELECTROLYSIS

By A. V. ABBOTT.

A little less than ten years ago Mr. I. H. Farnham, in a paper before the American Institute of Electrical Engineers, called attention to a corrosive action which was attacking the telephone cables in Boston, and rapidly spoiling them by perforating the sheaths, destroying the insulation. Mr. Farnham's researches led him to believe that the electric railways were responsible for the damage inflicted, because, as the roads used the ground as a return circuit, the current from the power station diffused itself throughout the surrounding soil, and finding a metallic structure, such as a lead sheath, gas pipe, water pipe, etc., naturally selected the material of least resistance on its return journey to the dynamo. In that familiar application of electricity known as electro-plating, a bar of silver, copper or other metal, is placed in an acid solution together with an object upon which a metal coating is desired. A current of electricity is passed between the two and, by some as yet but partially understood operation, the atoms of metal from the plate are torn off, enter into the solution, subsequently becoming deposited as a thin metallic coat upon the object to be plated. Mr. Farnham suspected that the electric railway stations, the lead sheaths of the cables, the iron walls of the gas and water pipes, together with the moist ground, were playing the part of a gigantic electro-plating machine; that the operation of the return current from the rails of the railway was to tear away the metallic atoms of the gas and water pipes and the cable sheaths, and to distribute them in the shape of metallic salts through the surrounding earth. It needed but a slight consideration to perceive that if this hypothesis was correct all the underground metal structures in the vicinity of electric railways were menaced with a corrosive action, which, like the mills of the gods, might be exceedingly slow, but in the end would grind so exceedingly fine as to destroy, or at least irretrievably injure, all subterranean metallic work. And for some months a widespread and vigorous agitation was initiated against the use of the ground return for street railways. To this operation the name of *electrolysis* has been given from its resemblance to the electrolytic action which takes place in a galvanic battery. With more profound investigation, and after longer experience, the alarm originally raised has largely died

away. In general, it is conceded that while the return rails of the electric railway certainly are possible sources of danger to metallic subterranean structures, the amount of damage at first feared was certainly overestimated. In most cities there are certain zones or territories in which electric corrosion is probable. These zones can be located with reasonable accuracy, and as they are restricted in area it is not difficult nor excessively expensive to provide adequate return conductors whereby the electrostatic current can be diverted from the water pipes or lead cables and safely returned to the power station. On the whole, experience goes far to justify this opinion, and the public has become more lulled to a sense of security, and is paying perhaps too little attention to the fact that in some cases electric corrosion is still going on, and that at a rate which, if allowed to continue, will in the end be highly injurious. Naturally, the owners of water works, gas pipes and the telephone cables are chiefly interested in the subject, for such companies are the largest investors in subterranean metallic structures, and likely to be the heaviest sufferers. An examination has recently been made in the city of St. Louis, which forms the subject of a report by Mr. E. E. Brownell to the Water Commissioner of that city, Mr. Atkins. During the progress of this examination an exceedingly careful set of electrical measurements was made, covering the entire central portion of St. Louis, which resulted in showing that in a number of places there was a strong probability of electric corrosion. A crucial test was made uncovering the gas and water pipes, giving an opportunity for visual inspection. At some places where the streets were opened photographs of the condition of the pipes were taken, which are herewith reproduced. Fig. 1



Medal for Pole Climbing.

is a picture of a 6-inch main at the corner of Geyer and Eighteenth streets, the pitting and corrosion of the pipe being indicated by the nails which have been inserted in the holes discovered. A similar and more serious case is that of a 30-inch main at Chouteau and Compton avenues, as shown in Fig. 2. While, finally, a pipe so corroded as to disclose a long longitudinal crack is shown in Fig. 3 in a photograph of the 18-inch main at Grand avenue and Twentieth street. Assuming that these photographs represent a condition of affairs which is more or less prevalent in

many cities possessing electric railways with grounded returns, the vital question is how to discover where such a condition exists, and how to remedy it after discovery. Experience has shown that danger from electrolysis only occurs where the metallic structures, such as gas and water pipes and lead covered cables are *electro-positive* to the surrounding earth—that is to say, where there is a tendency for the electrical current to *leave* the metal-

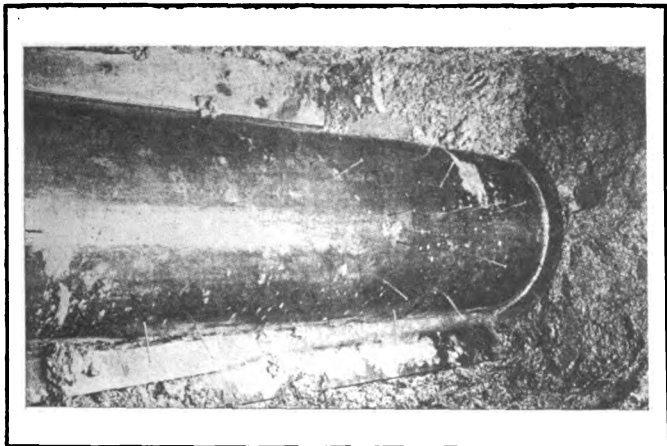


Fig. 1.

lic structure and *enter* the earth whenever the pipe or cable is negative to the earth—that is, whenever current is flowing *from* the earth *into* the metal there is absolutely no danger. It is only when the current leaves the metal for the earth that, so to speak, it operates to tear away portions of the metal and carry them off, that corrosive action is to be apprehended. Hence it follows that if frequent electrical measurements are made between the metallic structures and the earth, it is easy to discover and keep tab on the spots at which the current leaves the metal, which must be considered as points of probable danger. The earliest method of making such measurements was to equip an inspector with a low-reading voltmeter, having its poles marked, so that it was easy to determine the relative positiveness or negativity of any point by noting whether the needle deflected towards the positive or negative pole of the instrument and simultaneously determining the number of volts of difference of potential which existed. Then by attaching the positive terminal to a gas pipe, lead-covered cable, or other metallic structure, and grounding the negative pole, it is easy to determine the precise condition which exists at the point under examination. A telephone company has in its wire plant the opportunity of making an electrical

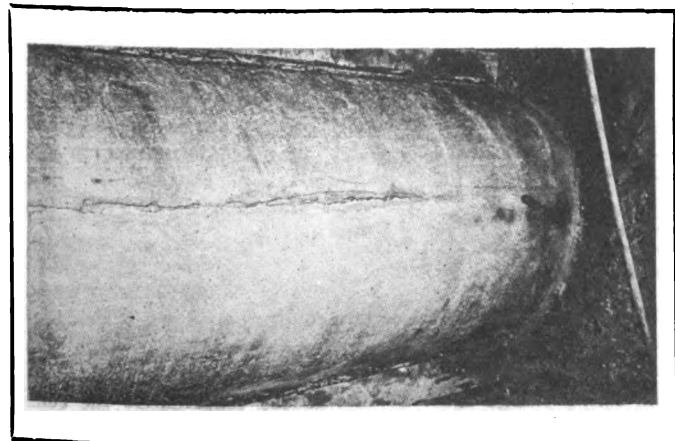


Fig. 2.

examination of the territory through which its cables extend in a much more rapid and simple manner. If the line of each subscriber be grounded at his station, and if an inspector equipped with a grounded voltmeter be placed at the central office, it is easy, by plugging into the subscriber's jack, to measure the difference of potential between the central office and the substation by an almost instantaneous reading of the voltmeter. Thus by providing a couple of inspectors, one of whom goes

successively to substation after substation, calls up the central office, notifies the inspector to read, and then momentarily grounds the subscriber's line, it is easy to obtain a complete map of the territory through which the exchange cables extend, which shall show the difference of potential at nearly every point. From the data thus secured one can plot upon a map of the town a set of lines which indicate the difference of potential at various localities. Fig. 4 and Fig. 5, on page 375, give the results of a survey of this description made in the cities of Toledo and Columbus, Ohio. A series of contour lines are there shown placed at intervals of one volt difference of potential, and indicate that as one recedes from the power station located on the river bank, the potential rises volt by volt, until on the outskirts five volts is found. Such a map is usually as follows: Everywhere a line which is parallel to any of the equi-potential lines will have little or no change in voltage, while a line which is placed at right angles or which intersects its curves will have considerable difference of potential. Cables, therefore, which are parallel to the equi-potential lines will not be in danger, while those which intersect them will be. While such an investigation does not entirely preclude the desirability of the voltmeter measurements between the metallic structures and the earth it largely reduces the amount of time required in the latter examination and indicates, invariably, where such measurements should be made. It has been shown that injurious action will arise only where current leaves the metallic structure, and the solution of the last problem is therefore to prevent absolutely

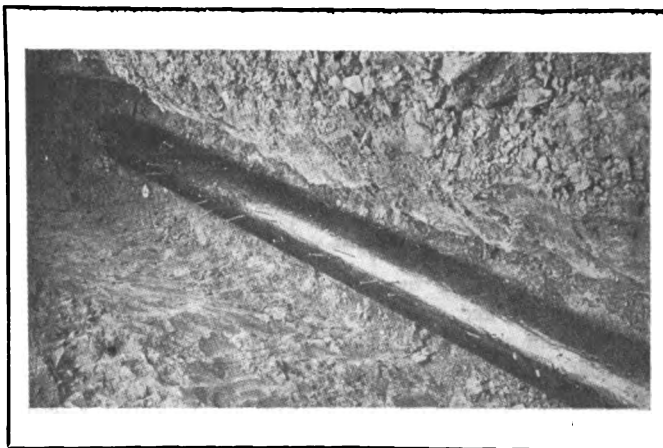


Fig. 3.

such a departure of current, for no matter how slightly a pipe or cable may be electro-positive, the least sign of a positive tendency is an invariable indication of possible danger. The two methods commonly adopted are as follows: Wherever an electro-positive point is found the return conducting system of the railway must be reinforced in such a manner as to prevent current from leaving the metallic structures. This may be achieved by improving the railway bonding, by introducing additional return feed wire into the railway conducting system, or by providing a special wire which by means of a large sleeve of ample area is attached to the metal structure, thus leading the current away from it without allowing any to pass into the earth. Another method consists in providing at a danger point a very large ground plate, which is cheaply and efficiently constructed by excavating a hole, at the bottom of which a ton or two of coke is placed. On top of this a lot of old iron, such as worn-out car wheels, old rails, chips from a machine shop, etc., are placed.

At the point where the metallic structure is found to be electro-positive, a large sleeve should be attached, which must be so arranged as to make the best possible metallic contact with the cable or pipe which it is desired to protect. This contact may be effected either by soldering the sleeve to the pipe or cable, or by securing metallic continuity with the use of Edison flexible amalgam. To the sleeve a copper wire of ample size is attached and carried to the ground plate, to which it is secured by a connection, made in a similar manner as that already described. As the copper wire is of much lower resistance

than the surrounding earth, the current naturally seeks the wire and travels to the ground plate, and by this artifice all electricity is prevented from passing into the ground from the surface of the pipe or cable, and thus corrosive action at this point is avoided. Of course, it is obvious that from the surface of the ground plate electricity will travel into the earth, and it will at once be reasoned that the corrosive action will be merely shifted to the pipe or cable and transferred to the ground plate, and in time this will deteriorate by electrolysis. This is perfectly true, but inasmuch as the ground plate consists of a large quantity of iron there is sufficient material to resist corrosion for a long period of time, so that, in many cases, it will be found cheaper to install a ground plate and renew the same once in five or ten years than to incur the expense necessary to provide the requisite copper cable to carry the current of the wire back to the power station.

It has been tritely remarked that eternal vigilance is the price of the dividend, and regarding metallic structures in cities where the electric railway has used grounded return it is equally true to state that eternal vigilance is the price of safety. The street railway companies are constantly changing their routes, the number of cars, the location of the power station, and the arrangement of the conducting system, and it is folly to believe that any form of remedy can be installed which will not need constant supervision. It is well, at least once a year, to make an electrolytic survey of the entire area in which the underground cables are located and to determine where the danger points, if any, exist, and decide upon the most economical methods of protection, and further to watch from time to time the effect of the methods that have been installed to ascertain their efficiency, and to demonstrate that all portions of the plant are protected.

HINTS ON THE CARE OF TELEPHONE STORAGE BATTERY PLANTS

ARTICLE II.

By CHAS. D. SPENCER.

"OIL of Vitriol" is of much higher specific gravity than the electrolyte required for the cells, and must never be used unless diluted. The dilute acid for use in accumulators must be pure. In many cases it is advantageous to the customer for him to purchase the concentrated acid and dilute it. When the acid is obtained diluted in carboys a test should be made of the electrolyte from a number of them. As it is the practice of chemical manufacturers in diluting the acid to mix it in one hundred (100) carboy lots, or thereabouts, so that one lot may be entirely free from any deleterious substances, while the others may contain chemicals that are ruinous to the cells.

The sulphuric acid must be free from impurities, such as arsenic, nitric or hydrochloric acid, and must be diluted with pure water to a specific gravity of 1.250 or 29° Baumé, as shown by an hydrometer at a temperature of 60° Fahrenheit. If the solution is not obtained ready for use, oil of vitriol of 1.84 specific gravity must be slowly poured into the water in a separate mixing vessel, well stirred and allowed to cool before the final specific gravity is taken. The acid must always be poured into the water and never the water into the acid. The mixing should be done with extreme caution on account of the heat generated. The solution should stand for about twelve (12) hours after mixing before it is put in the cells.

The following are the proportions by volume (not weight) for mixing "Oil of Vitriol" and water together for different specific gravities at a temperature of 60° Fahrenheit. Parts by volume:

Acid.	Water.	Sp. Gr.	Baumé.
1	2.7	1.300	34°
1	3.5	1.250	29°
1	4.	1.225	26½°
1	4.7	1.200	24°
1	5.7	1.175	21½°
1	6.75	1.150	19°

Either new wood, glass or earthenware may be used for mixing tanks. An old pair of shoes, woolen trousers and a flannel shirt should be worn when working with accumulators.

A bottle of ammonia should be kept in a convenient place, to be used to neutralize any acid that may happen to get on the clothing.

It is very important that charging the cells should be commenced immediately after the solution is added.

The acid must not on any account be put in until all is ready for charging.

It is a good plan to put into each cell enough acid to cover

a small portion of the pile and then turn on a slight current from the dynamo, completing the operation of filling with the dynamo in circuit, in order that the new plates may never stand idle for any length of time.

The acid must be poured in with care, splashing being avoided, and must cover the top of the plates at least one inch.

The specific gravity of the acid will drop when it is first put in the cells, and may not commence to rise for a considerable time after the charging has started.

When the cells are filled each should be covered

with a sheet of glass or other non-conducting plates, which prevents the loss of acid by evaporation, and arrests a large percentage of the spray which rises.

The initial charge must be commenced immediately the cells are filled at about one-third (1-3) of the normal rating for four (4) hours, then increased to the normal current, and continued for twenty (20) consecutive hours, until the positive plates are of a dark-brown color and the voltage of the cells are each 2.6 volts, while charging at the normal rate. Do not stop charging at the above period, but continue at a lower rate, gradually reducing the charging current until one-fourth (¼) of the normal rate is reached, at which rate it should be continued until the cells reach a voltage of 2.6 volts per cell.

In subsequent charges it is only necessary to charge until the voltage is 2.5 volts per cell while charging at the normal rate.

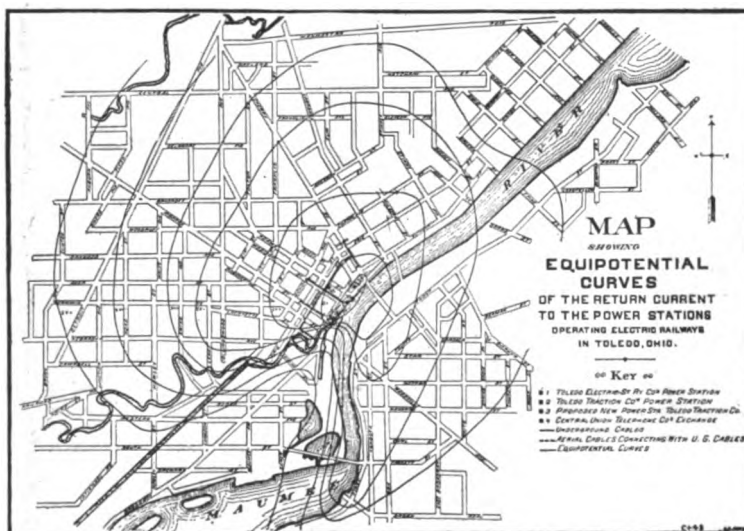


Fig. 4. Electrolytic Survey of Toledo, Ohio.

It is advisable about once a week to continue the charge after the cells have reached a voltage of 2.5 volts per cell at normal rate (at a reduced current) until the current is one-third (1-3) of the normal rate and the voltage per cell is 2.5 volts. The rate of charge and discharge is determined by the surface, size and number of positive plates.

Attention must be called to a mistaken notion that the cells will last longer if they are never fully charged. Nothing tends more to destroy the plates than partly charging the cells, and then exhausting them. If it is found that there is not time to charge the cells till the acid turns a milky color, or the voltage is 2.5 volts per cell, the dynamo and engine power must be increased.

ELECTRICAL INDUSTRIES FROM THE CENSUS STANDPOINT

DURING the past two or three years the United States Census Bureau has been compiling the first complete census of all electrical industries that has been made in the United States. Prior to 1900 some statistics had been compiled concerning the industries involved in the manufacture of electrical apparatus and in electric lighting. As the present investigation develops the first census ever taken involving telephony it is of particular interest. Upon May 27th a preliminary bulletin showing the condensed statistics relating to telephony for the year ending December 31, 1902, was issued, which is as follows:

Construction, Equipment, Etc.	Total.	Commercial.	Mutual.
Number of systems.....	4,151	3,157	994
Miles of single wire.....	4,850,486	4,779,571	70,915
Telephones of all kinds.....	2,371,207	2,225,981	89,316
Number of subscribers.....	2,371,256	2,048,736	88,520
Number of automatic pay stations..	77,007	73,869	18
Number of all other pay stations...	48,393	48,009	384
Farmer or rural lines owned by commercial systems:			
Number of lines.....	15,598	15,598	.....
Miles of single wire.....	138,426	138,426	.....
Number of telephones.....	121,905	121,905	.....
Number of party lines.....	258,166	248,908	19,258
Number of telephones on party lines	886,152	808,571	77,581
Number of public exchanges.....	10,361	9,419	942

Interest on bonds.....	3,511,948	3,511,768	180
Net surplus	7,178,046	7,157,792	20,254
Condensed Balance Sheet.	Total.	Commercial.	Mutual.
Total assets	\$452,172,546	\$449,485,693	\$2,686,853
Construction and equipment (including real estate and telephones)	389,278,232	386,662,619	2,615,613
Stocks and bonds of other companies	9,938,342	9,938,342	.....
Machinery, tools and supplies...	9,689,691	9,657,956	31,735
Bills and accounts receivable....	30,629,677	30,610,294	19,383
Cash and deposits.....	12,291,840	12,271,718	20,122
Sundries	344,764	344,764	.....
Total liabilities	452,172,546	449,485,693	2,686,853
Capital stock	274,049,697	273,388,432	661,265
Bonds	73,981,361	73,978,361	3,000
Cash invested (unincorporated systems)	6,161,299	4,571,318	1,589,981
Bills and accounts payable.....	44,491,066	44,411,639	79,427
Sundries	1,124,265	834,561	289,704
Net surplus and reserves.....	52,364,858	52,301,382	63,476

In addition to the reports obtained from commercial and mutual telephone systems, shown in the above table, the Bureau secured reports of 4,985 farmer or rural lines, having 49,965 miles of single wire and 55,747 telephones. These figures added to the totals for the commercial and mutual systems give a grand total

Investment in Construction.	Per cent. of total.	Gross Income.	Per cent. of total.	Operating Expenses.	Per cent. of total.	Ratio Expenses to Earnings.	
Electric Railways	\$2,167,634,077	68.3	\$247,553,999	54.2	\$142,312,597	47.4	57.5
Electric Light	504,740,352	16.1	84,166,605	18.4	86,081,375	22.7	30.1
The Telephone	389,278,232	12.3	86,825,536	19.2	61,152,823	20.4	70.4
The Telegraph	104,383,075	3.3	37,552,450	8.2	28,490,219	9.5	75.3
Total.....	\$3,166,035,736	100.0	\$456,098,590	100.0	\$300,037,014	100.0	....

Table Showing Amount of Investment in the Four Principal Electrical Industries.

Number of private branch exchanges	7,883	7,883	.....
Manual switchboards, total number	10,842	9,901	941
Common battery systems.....	837	830	7
Magneto systems	10,005	9,071	934
Automatic switchboards	54	53	1
Messages or talks during year, total			
number	5,070,555,345	4,971,413,070	99,142,275
Local exchange	4,949,850,491	4,851,416,539	98,433,952
Long distance and toll.....	120,704,854	119,996,531	708,323
Employees and Wages.			
Salaried officials and clerks:			
Total number	14,124	13,958	166
Total salaries	\$9,885,886	\$9,871,596	\$14,290
Wage-earners:			
Total average number.....	64,628	63,630	998
Total wages	\$26,360,735	\$26,206,065	\$163,670
Revenue and Expenses.			
Total revenue	\$86,825,536	\$86,522,211	\$303,325
Total expenses (including taxes and fixed charges except interest on bonds)	61,152,823	60,871,002	281,821
Dividends paid	14,982,719	14,981,649	1,070

* Urban party lines.

† Rural party lines.

‡ Includes assessments.

for the continental United States of 9,136 systems and lines 4,900,451 miles of single wire, and 2,371,044 telephones.

A number of commercial systems operate in rural districts, but combining the totals for farmer or rural lines owned by commercial systems, mutual systems, and Independent farmer or rural lines, gives a total of 21,577 systems and lines, 259,306 miles of single wire, and 266,968 telephones, operated exclusively in rural districts.

In addition to the statistics presented above for the continental United States, reports were received for 1 commercial system in Alaska and 7 in Hawaii, having a total of 4,732 miles of single wire, 2,493 telephones of all kinds, 3,461,000 messages or talks during the year, \$112,068 total revenue, \$76,307 total expenses (including taxes and fixed charges), and \$25,858 paid in dividends, leaving a net surplus of \$9,903.

It is interesting to compare the statistics shown in this bulletin with those relating to the other electrical industries—namely, electric lighting, electric railway and the telegraph, which have previously been published. A comparative abstract is shown in the above table.

AN AUTOMATIC PRIVATE LINE EXTENSION

By N. C. KISSELL.

IT is often desirable to use the main and extension instruments of an exchange circuit as a private line without signaling the operator. The writer suggests the following circuit, which he has found to work in a most satisfactory manner, and at the same time requires no additional switches or any apparatus which would complicate its operation as far as the users are concerned. This circuit is adapted to work on any system, the vital point being to cut in and out the central office automatically.

through his key, wire 11, bell *G*, wire 12, back to battery at *D*, ringing *B*'s bell. If *A* desires to speak privately to *B* he presses his button to signal, but as his receiver is on the hook there are two paths for the current to return to the battery—one through the bell at *B*, and the other from the key, wire 18, through the hook, wire 3, the hook at *B*, key, wires 10, 5, through relay *C* back to battery at *D*, drawing up the relay. This is shown in detail in Fig. 2, (a) being the circuit with the receiver on the

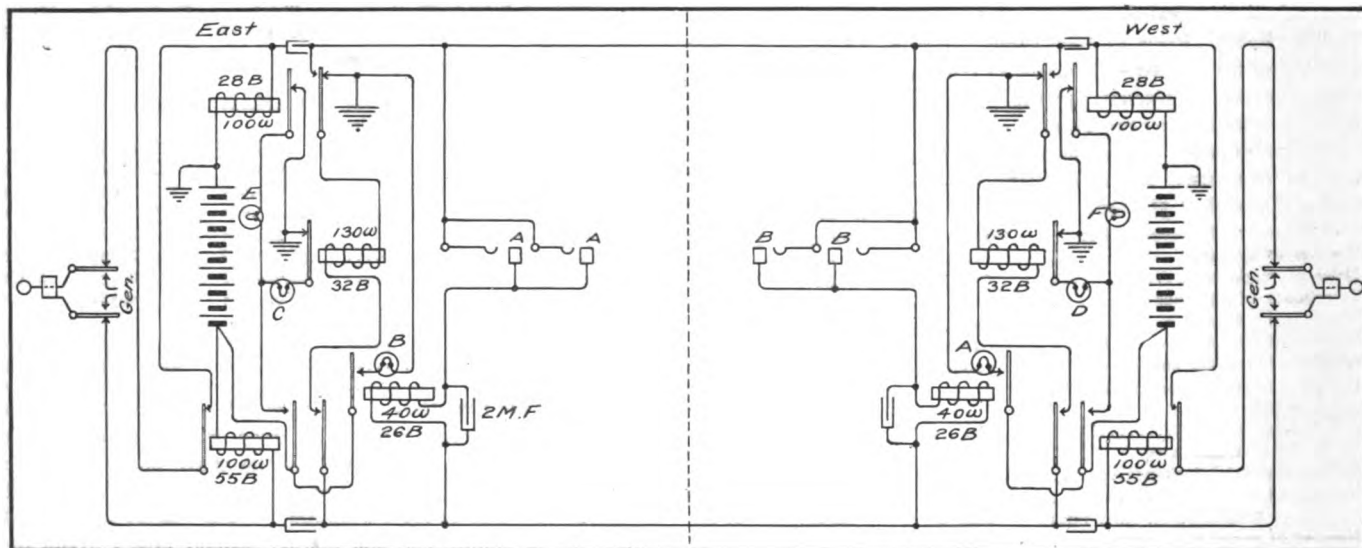


Fig. 1.

In Fig. 1 *A* is a subscriber's station, with an extension at *B*. If either party desires the exchange it can be secured in the usual manner by lifting the receiver off the hook. In receiving a call *A* answers as the bell is located at this station. If *B* is wanted the party at *A* pushes the button, calling *B*, at the same time keeping his receiver off the hook to hold the line till *B* answers. It will be noticed that when either receiver is off the hook the ground is broken, thereby keeping the supervisory light at the exchange from burning. Now if *A* wants to talk to *B* privately, or vice-versa, he presses his button calling him, at the same time taking down his receiver. The operation is as follows: When *A* takes down his receiver to call central a circuit is made

hook, and (b) the circuit with the receiver down. The resistance of the bell at *B* is the same as the relay, so the current will divide equally through both. Now before *A* releases his button he takes down his receiver, breaking one circuit through the relay, and making one from battery at *E* through top relay contacts at 19, wires 13, 7, through his hook, transmitter, receiver, wires 4, 5, through relay, back to battery at *D*, holding it up as long as his hook is up, and furnishing local talking battery. When *B* answers the battery current will divide at 8, giving both current to talk with. The operator is prevented from coming in, as the exchange circuit is open at the lower contact of the relay. The local talking circuit is shown in detail in Fig. 3. The relay, having a high impedance, prevents the battery short cir-

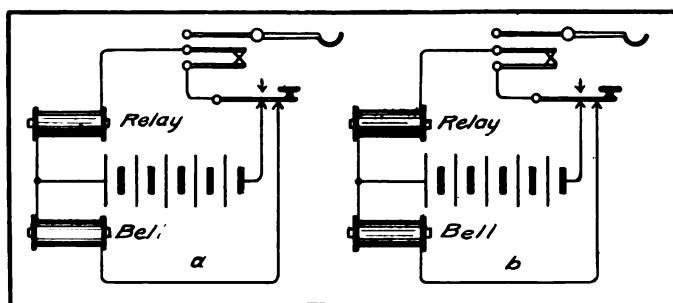


Fig. 2.

from *S* side of line wires, 13, 7, through his hook, transmitter, receiver, wires, 4, 5, to *T* side of line, sending in his call. If *B* takes down his receiver a circuit is made from *S* side of line, wires 13, 14, through his hook, transmitter, receiver, wires 15, 5, to *T* side of line, sending in the call. When the operator rings the current comes in on *T* side of line, wires 5, 4, 16, through bells, hook at *A*'s instrument, wire 17, through *B*'s hook to ground. If the party calling should desire *B*, *A* presses his button, making a circuit as follows: From battery at *E*, wires 1, 2,

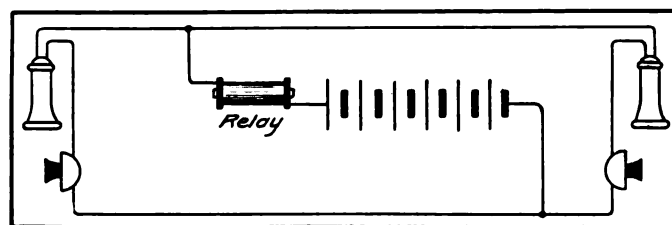


Fig. 3.

cuiting the instruments. After the receivers are hung up the circuit is broken through the relay, restoring the exchange connection. It will be noticed the signaling circuit at *B* is different from the one at *A*, and is as follows: From the battery at *E*, wire 1, through the key at *B*, wire 20, hook, wire 3, through the hook at *A*, wire 18, key, wire 21, bell, wires 4, 5, through relay back to the battery at *D*, ringing *A*'s bell and drawing up the relay.

By carefully following the diagram it will be noticed that when either party signals the other, drawing up the relay, the circuit is through their respective hooks. If this was not the case, and

A was conversing with an outside party when *B* signaled, he would be cut out by reason of the relay drawing up, but the circuit is open at *A*'s hook and the relay cannot be energized, and vice versa. The relay should have a large number of turns and be about 100 ohms in resistance. The signal bells are of the ordinary vibrating type, rewound to the same resistance as the relay, 100 ohms. The bell at *A* differs in connections from the one

at *B*, as shown in Fig. 1, the armature shunting the coils when drawn up, thereby giving it a vibrating motion without any fluctuations of the current, which would affect the relay. The ringing buttons were two ordinary strap keys, top and bottom contacts, with an extra contact placed in *A*'s key. About six cells of ordinary dry battery are necessary to operate the relay and give good talking results.

OHIO INDEPENDENT TELEPHONE ASSOCIATION MEETING

THE Ohio Independent Telephone Association was organized in Columbus, June 2d, to take the place of the Independent Telephone Traffic Company, and the former organization of the Independent interests in this State. The meeting convened at the Hartman Hotel, at 9:30 A. M. An address of welcome was made by H. A. Lanman, president of the Columbus Citizens' Telephone Company, which was responded to by G. P. Thorpe, attorney of the Wilmington Home Telephone Company.

Mr. James B. Hoge, of Cleveland, then addressed the convention, outlining a plan of organization. Two hours were very profitably spent in discussing various subjects that had been put in the question box. Cyrus J. Huling, Esq., of Columbus, made a complete report on the post-office telephone fight which was made in Washington last winter, showing how completely they gained their point. The committee on permanent organization presented a set of rules and regulations for the government of their association, after which the following officers were elected:

Frank L. Beam, Columbus, president; vice-presidents, W. Gilbert Thompson, Lebanon; G. P. Thorpe, Wilmington; James B. Hoge, Cleveland; R. E. Hamblin, Toledo; J. C. Reber, Dayton; Dwight E. Sapp, Mt. Vernon; George E. Metheany, Lima; W. F. Laubach, Akron; J. B. Rhodes, Zanesville; E. E. Knox, Portsmouth, secretary; Ralph Creamer, Columbus, treasurer and assistant secretary.

An executive committee consisting of nine members, of which the president is *ex officio* chairman, is yet to be appointed. The plan of organization is to divide the State into nine districts; each vice-president to take charge of a district and organize the same so as to make a complete union of interests.

It is understood that

rates of service were not discussed to any extent, but the matter of telephone insurance rates was taken up in some detail. In fact, one of the chief aims of the association is to take some action to secure lower rates, even if it is found necessary to form a mutual insurance company among the Independent telephone interests. Many of the leading Independents have already been canvassed, and are said to be generally favorable to the proposition.

It is asserted by the telephone people that a comparison of losses on telephone properties for a few years back with those on other property will show that the risk demanded by the insurance companies is out of proportion to the losses paid. The aggregate value of the Ohio Independent telephone properties is so great that the item of insurance amounts to a large sum. To cut down the insurance cost the Independents believe will be possible only with a mutual association. The executive committee of the new organization is looking the matter up.

Reports to the convention show a very satisfactory condition over the State. Mr. Harry Gates, of the Queen City Telephone Company, of Cincinnati, made a very interesting report, stating that work had been commenced on the Cincinnati plant, and that they expected to have their plant in full operation inside of the next two years. He said that franchises would be asked for immediately in all the adjoining suburbs. This is the first time that an attempt to organize the Independent telephone interest of the States has been successful. There were 225 delegates present, representing over 150 companies.

The object of the association is primarily intended to establish closer relationship between companies rather than an association for managers and superintendents.

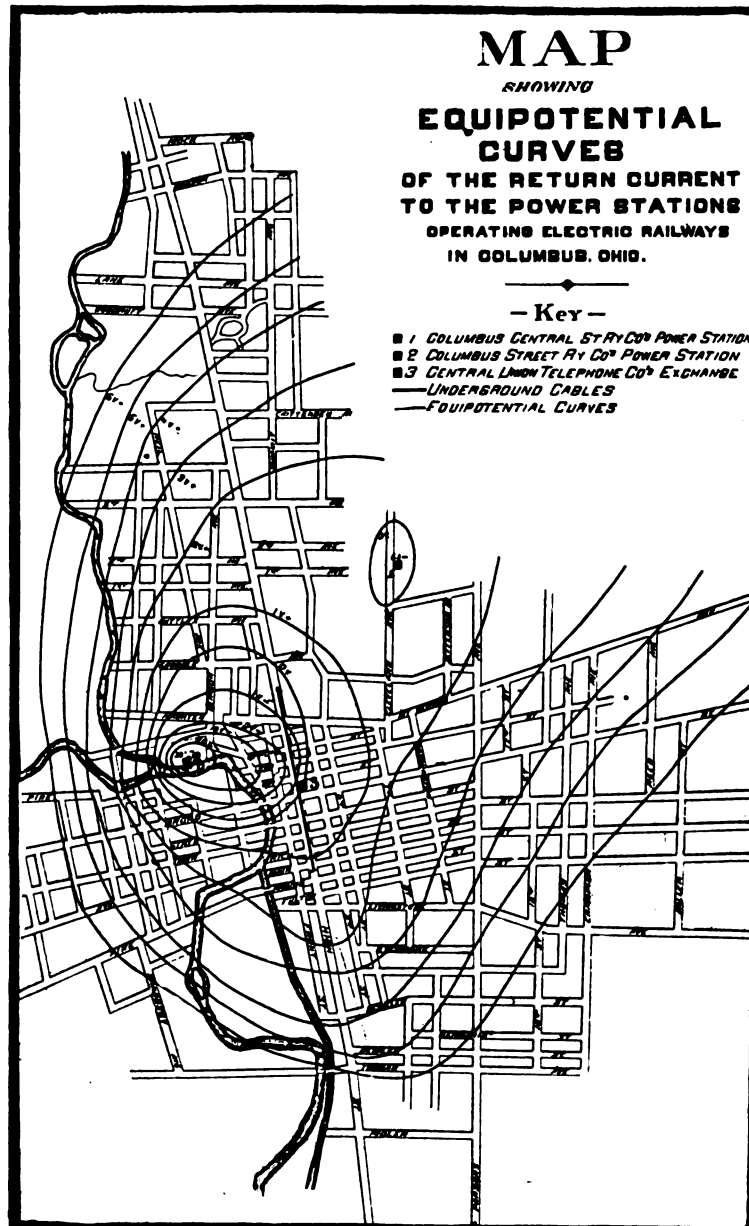


Fig. 5. Electrolytic Survey of Columbus, Ohio.



THE GROWTH OF THE TELEPHONE INDUSTRY.

WHAT will be the future of telephony is an interesting question to those who have watched with observing eyes the development of this marvelous scientific appliance, whereby the human voice can be thrown across a continent. We easily grow accustomed to wonders. Residents at the brink of the mighty Niagara give this marvel of nature but scant notice. We speed across the country in a moving palace, without giving a thought to the iron horse which has so revolutionized human society and commerce, except perhaps to grumble because the speed is not greater. And we square ourselves in front of a hole in the wall and talk unintelligible gibberish to the empty air without a suspicion that we are performing a miracle which would have hung some of our ancestors for witchcraft.

Men, still young, remember when the telephone was first put to commercial use, and have watched its tremendous development and the revolution in business methods which it has accomplished. Yet telephony is in its infancy. There are remaining many promising fields which have never been exploited. We are standing on the threshold of telephonic achievement, and, much as has been accomplished, there is more to follow.

Some idea of the growth of this newest marvel for which commerce is indebted to science can be gained from the preliminary report on the telephone systems of the United States, issued by the Census Bureau recently. The figures must have made even those matter-of-fact statisticians open their eyes in surprise, accustomed though they are to great aggregates. According to the report of the bureau, in the year 1902, more than five thousand million telephone messages were exchanged in the United States. These enormous figures can hardly be comprehended.

The report covers all commercial and mutual telephone companies. At the time covered by the report there were a total of 4,151 systems in the country, with 4,850,486 miles of wire and 2,315,297 telephones. This is truly the wire age. Add to this network of telephone wires the millions of miles of telegraph and other electric wires and the mind stands appalled in the presence of the most significant phenomena of the times.

These 4,151 systems had subscribers numbering 2,137,256. The total revenues of all the companies during the year amounted to \$86,825,536, with total expenses of \$61,152,858. Dividends amounting to \$14,982,719 were paid. In these telephone companies there were 14,124 officials and clerks, receiving salaries amounting to \$9,885,886, while \$26,369,735 were paid as wages to 64,628 workmen. The total assets of the companies are placed at \$452,172,546, and the net surplus at \$52,364,858.

In addition to the reports obtained from commercial and mutual telephone systems, the bureau secured reports of 4,985 Independent farmer or rural lines, having 49,965 miles of single wire and 55,747 telephones. But this is not all. This report is

WHAT THE INDEPENDENTS HAVE DONE.

almost ancient history. The period covered was two years ago, and events move rapidly in the telephone world. Since then the telephone business in the United States has increased one-third.

Yet the telephone business is only in its infancy. There are wonderful possibilities in the development of rural systems. There are six hundred thousand farms in the country, according to the census reports. The farmer needs a telephone far more than does his city brother. Every one of this great number must eventually be connected with at least a local system. The indications are that the future growth of telephony will be in the direction of these Independent, neighborhood systems, which will eventually gridiron the country and go far toward solving the problem of rural isolation. These farms must not only have communication with each other but with the commercial centre of the district. These commercial centers will reach out and get into communication with all the other commercial centers in the country, until finally the people of the United States will all be on speaking terms with each other.

It must not be forgotten that the chief factor in this great development in telephony has been competition. In the year 1894, which marks the beginning of the telephone movement, the Bell company put out only eight thousand telephones in the United States. The increase of business in single counties to-day is almost as great. Compared with the vast area of the country, and the population, the number is insignificant. The telephone was not a new thing in 1894. The Bell company has been doing business for years; but, as with all monopolies, the rights and needs of the people were a secondary consideration. Not until the expiration of patents made competition possible could the people effectively revolt from such tyranny. It was the Bell telephone or nothing at that time. Then came the establishment of Independent systems by men thoroughly disgusted with Bell methods, who refused to pay tribute to this long-armed tyrant; men who were wise enough to see that to make an exchange a success there must be local management by men known and respected in the community and knowing the needs of the people, as well as the conditions of the territory to be served.

The old maxim that competition is the life of trade does not make an exception of the telephone business. For the first time in its career the Bell company began to have competition. Strife for new territory commenced; business was encouraged everywhere; rates were lowered; telephone appliances were improved; new industries were founded; better service was given; the rights of the people began to be considered and the needs of the people to be studied.

Competition has effected these astounding changes. Yet the whole course of the Bell company from the beginning has been a struggle to prevent competition and maintain a monopoly of the telephone field.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

WHERE SUIT MAY BE BROUGHT.

We are incorporated under the laws of Iowa and our principal place of business is in ——— county. Our line runs through two adjoining counties, in one of which we have been sued. Can we legally be sued outside of the county where our office is?

UNDER the laws of the State a telephone company is to be regarded as a telegraph company. A telegraph company may be sued in any county through which its line runs. The rule is, therefore, that a telephone company may be sued in any county where it maintains its line. *Franklin vs. North Western Tele. Co.*, 69 Ia. 97, 28 N. W. 461.

CITY'S RIGHT TO MOVE POLES.

Has the city authority to make us move our poles, the place where they stand being convenient and not dangerous or interfering with anything, and the place where they want us to move to being impracticable?

AS this inquiry comes from Missouri, it will be answered in the light of the statutes of that State, which authorize telephone companies to set their poles along any street in such a manner as not to incommode the public. If the poles are set in this manner, and there is no good cause for moving them, the city could not do so, and any ordinance it might pass to that effect would be illegal and void. *City of Hannibal vs. Missouri & Kansas Telep. Co.*, 31 Mo. App. 23.

CHARGE FOR MOVING A TELEPHONE.

What is the customary charge for moving a telephone; also for a party who orders a telephone put in and then, eight months after, they move across the street? In this case I had to put up a new line for them (metallic) also the inside wiring. They refused to allow me anything, but will abide by your answer, so what you say goes.

J. E. S.

The customary charge for moving a telephone depends upon conditions. Where there is sharp competition with the Bell company the charge is usually placed at as near the average cost to the company as possible. Under such conditions a reasonable charge would be \$5 if their old line wires could be used.

POLES MUST BE SIGHTLY.

Has the city any right to dictate to us the kind of poles we shall erect? They claim that our poles are not neat looking.

ACITY usually has power, given in its charter, to regulate the erection of telephone poles. Under such a power it may require that the poles shall be neat and shapely, and not broken and unsightly ones. *Forsyth vs. Baltimore & Ohio Telep. Co.*, 12 Mo. App. 494.

PROPOSED LEGISLATION IN IOWA.

IN an argument in favor of the passage of a bill compelling telegraph companies to receive and transmit telephone messages received from any telephone company, Representative Manning, in the Iowa House of Representatives, made a sharp attack upon the Western Union and Postal Telegraph companies. The Western Union has an agreement with the Bell company, and will not transmit any other company's messages. In his argument before the house committee on telegraph and telephones, Representative Manning showed by figures the comparative strength of the Independent and Bell telephone companies in Iowa, and illustrated the injustice of the monopoly of the corporations. The situation in the State was as follows:

The Independent telephone companies (1,200) have over 100,000 telephones.

The Bell Telephone Company (1) has only 18,236 telephones.

The Independent telephone companies (1,200) have over 15,000 miles of pole lines.

The Bell company (1) has 6,313 miles of pole lines.

The Western Union Telegraph Company (1) has 7,769 miles of pole lines.

And the Postal Telegraph Company (1) has only 957 miles of pole lines.

He also went extensively into the stipulations of the famous agreement of 1879 between the Bell and Western Union companies.

The bill is fathered by the Legislation Committee of the Iowa Independent Telephone Association, and provides that every person, partnership or corporation, owning or operating a public telegraph line in the State, shall allow telephone companies to put on and take off from the telegraph lines telephone communications. The bill further provides, for the telegraph companies' protection, that the connections for such receiving and taking off of messages shall be through instruments and apparatus capable of operating over such distance. By provisions in the bill the executive council will have the power to determine the charges or the division of the toll fees between the telephone and telegraph companies.

RATIFICATION OF CONTRACT.

WHERE defendant purchased the franchise and property of plaintiff telephone company, and retained possession, and the use and benefit thereof, for several years thereafter, and converted a portion thereof to its own use, defendant was thereby estopped from claiming, in an action to recover the purchase price, that plaintiff's board of directors had no authority to make the sale through its vice-president, treasurer, and one of its directors."

Thus the Supreme Court of Wisconsin held in the case of the Badger Telephone Company vs. the Wolf River Telephone Company. An agreement was made between the two companies that the latter company should purchase the franchise and property of the former. A memorandum in writing was prepared but not signed at the time the contract was made. When the plaintiff requested the defendant to sign the contract the defendant refused. In the meantime, however, the defendant had taken possession of the plaintiff's property and collected the proceeds therefrom. Plaintiff brought suit alleging these facts in one count of its declaration. In another count is alleged that the defendant agreed that, in consideration of the property so sold and delivered, it would execute and deliver to the plaintiff thirty shares of the capital stock of the defendant corporation, of the par value of \$50 each, amounting to \$1,500, and that the same had an actual value of \$1,500. The defendant answered by way of a general denial, and also set up a counterclaim of \$300 alleged damages for an alleged breach of a written contract in regard to building a telephone exchange.

The court held that the two causes of action were properly united, because they both grew out of the same transaction and were in fact the same contract. It was argued that the transaction was void under the statutes of frauds, but the court held otherwise because of the delivery of the property. It was further decided that under the statute of the State authorizing corporations to purchase and hold any right, privilege or franchise, conferred on any person or persons whomsoever, where such privilege or franchise is in direct aid of the business for which the corporation was organized, the defendant company was authorized to take and acquire by purchase and assignment and thereafter own, the rights, privileges and franchises of the plaintiff corporation, located in the same vicinity. The court even held that under the facts of the case the stockholders might fairly be presumed to have acquiesced in the transaction if they did not expressly ratify it. *Badger Telep. Co. vs. Wolf River Teleph. Co.*, 97 N. W., 907.



IN THE OPERATING FIELD.

THE EVANSVILLE (IND.) HOME COMPANY APPLIES FOR A FRANCHISE.

THE Home Telephone Company, of Evansville, Ind., recently organized, has applied to the Board of Public Works for a 30-year franchise. In the application the company agrees to pay the city \$4,000 annually, and suggests allowing this money to remain in the hands of the telephone company to be applied to the purchase of the exchange by the city at any five year period after the first ten years, the city to receive 3 per cent. interest compounded annually. Otherwise the city has the right to purchase the plant by paying one-half of the price stipulated in cash and the remainder in four annual instalments.

Wires within the fire limits are to be put in conduits and cables are to be used whenever possible. The company agrees to file a \$10,000 bond to have the plant complete and in operation in one year after the franchise has been granted, and agrees to deposit same to be used for street repairs. The company also agrees not to assign to any company now in the field or any other that shall be allowed to operate in the city, the franchise or contract granted to them by the city. The charges for service are to be as follows: Business, \$4; residence, \$2; party line, \$1 per month. After 6,000 subscribers are secured the company is given the right to increase the rates 25 cents for each additional thousand.

CENTRAL UNION (BELL) REDUCES RATES.

THE Central Union Telephone Company has issued a new order reducing toll rates in Indiana, Ohio and Illinois.

This is one of the alleged reforms of the new management, which took charge of the plant in the three States last year. The new order announces that new toll lines have been built and that the company is now able to handle more business and give better rates. This appeal is deceiving no one. The lower rates are forced upon them by reason of a superior opposition service which has outgrown the Central Union lines in nearly every portion of the territory named. Where this opposition does not exist the old rate is charged, a lingering evidence of the Central Union's methods from its inception. There will be a bitter struggle for toll line business in the States named, but no one doubts that the Independent lines will ultimately control the field.

DEMAND FOR ELECTRICIANS IN THE ARMY.

THE demand for electricians in the Artillery Corps of the United States Army is far in excess of the supply. The positions that are open require a certain amount of technical knowledge which seems to be the drawback. The salary of \$75 a month is the highest pay of any of the enlisted force, yet, notwithstanding this inducement, it appears that the restrictions in military life are too great to attract capable men. The department has existed for over a year, and so far only six applicants have been appointed who in all respects were qualified. Six others are being trained in the practical discharge of duties of the position at Fort Totten, N. Y., but there still remains thirteen appointments for master electricians.

THE GROCERS AT INDEPENDENCE, MO., REVOLT.

THE grocers of Independence, a suburb of Kansas City, Mo., gave the Bell telephone people notice the first of May to take out their telephones, and as no attention was paid to the notice the first of June, seventeen out of the nineteen grocery stores in the town using the Bell service disconnected their telephones. They still subscribe to the service of the

Home Telephone Company, which, they claim, reaches more subscribers than the Bell system does, and the rates are lower. The manager of the Bell company states he will put two instruments in each of the two stores which continued the service. Why not try a branch exchange and give trading stamps?

THE TELEPHONE AIDS A LAWYER.

THE telephone saved the day for a Marion, Ind., lawyer. Judge Ryan, of the Madison County Superior Court at Anderson, had established a rule that lawyers had to watch their cases and be ready for trial at the time set, else they would be wiped off the court docket. The Marion lawyer had forgotten the Judge's orders and was about to let a case go by to a later day because he was not ready for it. When he recalled it he was too far away to get to the court in time to save the case, it being cleared from the docket, but he thought of the telephone, and calling up the judge was permitted to make an appearance by telephone and an extension of time was allowed.

INDEPENDENT LONG-DISTANCE CONSTRUCTION.

THE first link in the big Independent long-distance line, which is to reach from the Atlantic Coast to Kansas City, was started in Pennsylvania on June 1st. It consisted in the letting of the contract for the construction of the Pittsburgh & Allegheny line from Pittsburgh to Wheeling, a distance of 67 miles by rail, but only 52 by telephone. The route is through Carnegie, and from Wheeling the line traverses Ohio to Columbus, at which point it connects with other Independent lines. It is the Pittsburgh & Allegheny Company's part in the work of construction of the big system. The contract was awarded to Keeling & Ridge. The work starts within 15 days and must be completed on or before August 15. The company this week also let a contract for 600 miles of copper wire to John A. Roebling & Sons, of Trenton, N. J. This wire is for the big long-distance line.

NEW ENGLAND INDEPENDENT COMPANY FIGHTS THE BELL.

THE Farmington Valley Telephone Company, of New Britain, Conn., has made application to the superior court, which will be held at Winsted, Conn., June 10th, at 10.30 A. M., for a finding of public necessity and convenience for the extension of their lines over Town Hill.

This application is the result of litigation over a right of way for their line on Town Hill. The Southern New England Telephone Company (Bell) has been very active in this territory during the past two months. Their rates have been cut to \$9 per year for business or residence. It was reported by their representative—so Dame Rumor has it—that as they could not purchase the small company they would kill it. At present it seems to be a lively kind of a corpse.

THE TELEPHONE IN LONDON.

MR. HERBERT LAWS WEBB has an interesting article in the London *Daily Mail* on the manner in which the telephone as a necessity in New York becomes a luxury in London. British bankers will not use the telephone service. In America bankers are wholesale users of the telephone. In London there is not a hotel having telephone service in all the rooms. In New York, the hotel which does not have the city telephone service in every room is the exception. The Metropolitan police refuse to use the telephone. The New York police have an elaborate system of their own, and connection with the general system

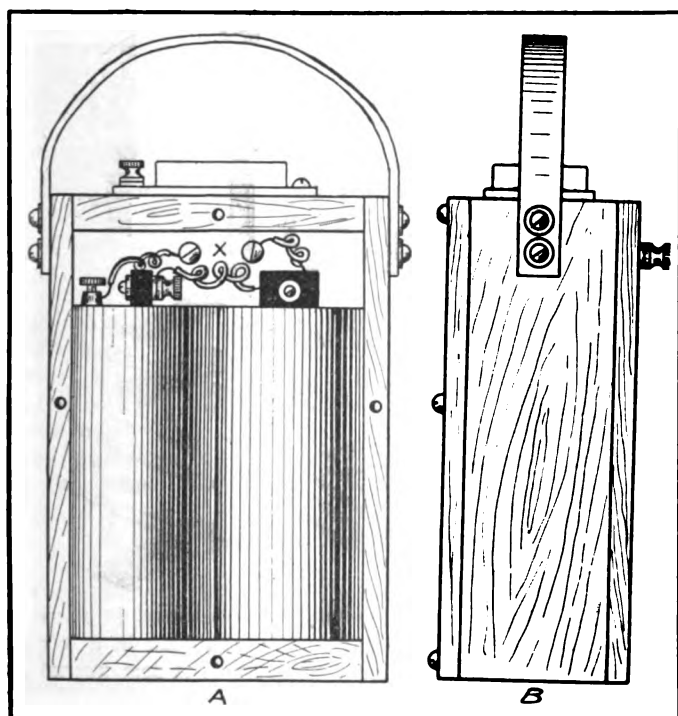
at every station. In New York for years past the police have managed all large processions by telephone. In London the police and the military manage processions by flag signaling! The broad difference between the American and the British public, and their respective authorities, is that the former welcome all devices aiming at saving time and increasing efficiency, while the latter resist them to the last ditch."

A BATTERY TEST SET.

By OTIS J. DORWIN.

TO have a place for everything, and to keep things in their places, is a labor-saving rule to follow. Anything tending toward the saving of useless labor is manifestly worth adopting, providing the time and effort gained thereby are sufficient to justify the cost or trouble involved in instituting the labor-saving agency.

An ordinary battery and buzzer test set is usually considered indispensable about a telephone exchange, and the uses to which a test set of this kind can be put in locating switchboard and instrument trouble are sufficiently numerous to justify a permanent and conveniently portable form of the set. Having a test set enclosed in a wooden box or case, with a leather strap for a



handle, does away with the inconvenience of gathering together the various parts and connecting them every time it is desired to make a test.

The illustration shows a very convenient form of battery test set. The set consists of two dry cells, one battery buzzer, two binding posts (which may be taken from old dry batteries), a leather strap and a box about $7\frac{1}{2} \times 5\frac{5}{8}$ inches in inside measurement. The best method of constructing the box is shown by sketch A in the figure. This shows the box with batteries in place and the back (which screws on) removed. On the top is placed the buzzer and on the front side of the box are placed the two binding posts, shown in the sketch B.

PITTSBURGH & ALLEGHENY TELEPHONE COMPANY NEWS.

THE Pittsburgh & Allegheny Telephone Company has selected Wilkinsburg as the first place to operate a test system of the automatic telephone. The company also proposes free installation for Homestead, Pa., with 5 cents per call charge. A few days ago officials of the Pittsburgh & Allegheny Company made an inspection of various parts of their system, going from

one exchange to another in a special chair car over the lines of the Pittsburgh Railways Company. In the party were Senator William Flinn, Robert C. Hall, H. B. Beaty, D. P. Reighard, R. H. Binns, J. G. Splane, Ralph E. Flinn, Rodger Williams, John S. Weller, C. C. Taylor, Henry Schmulbach, John A. Howard, J. V. Ritts, James Kountz, Jr., William E. Hurd, N. W. Brooker, J. G. Davis and F. J. McDonough. Several of these men are interested in the project to put tunnels under the important downtown streets for the delivery of freight. It is believed that the extensive system of underground conduits which the P. & A. company has in the city can be enlarged and used for the proposed tunnels, and legal advice is now being sought with a view to doing this.

THE VOUGHT-BERGER COMPANY'S PLANT DAMAGED BY FIRE.

ON Saturday night, June 4th, the factory of the Vought-Berger Company, La Crosse, Wis., was partially destroyed by fire. The fire was first discovered in the assembly rooms on the second floor of the main factory building, and before it could be extinguished the heat had ruined a large portion of the work in progress in the telephone and switchboard departments. Fortunately, however, the machine shops, wood-working plant and the plating and buffing departments were uninjured. All the buildings remained intact and the machinery, tools, dies and jigs and also raw materials and reserve stock (kept in separate and fireproof buildings) were in no way damaged. The financial loss is placed in the neighborhood of \$7,000 or \$8,000, but no salvage will be attempted as the company does not care to allow its reputation to be impaired in the slightest for the difference of the few thousand dollars involved. The company was, fortunately, on the verge of making many improvements and enlargements to better handle the unprecedented amount of business that has been coming in, and these fully matured plans will be carried out immediately. The company wishes to state that the delay in shipments will not be more than a week, and that absolutely no damaged material will be delivered to any of its customers.

WEATHER FORECASTS BY TELEPHONE.

THE Cleveland office of the U. S. Weather Bureau has entered into an agreement with the United States Telephone Company whereby the company will telephone the official forecast to every exchange of its own in the thirteen counties desiring it in the northeastern portion of the State, which includes the Salem exchange.

The forecast is received at the Cleveland weather bureau at 10 o'clock A. M., and it will be immediately forwarded to every exchange in the thirteen counties. The approval of the chief of the weather bureau has been received for the plan, and it will probably be in working order within ten days throughout the territory intended to be covered.

It is the largest system of distributing weather news in the States, and in the mind of the chief of the weather bureau will be the forerunner of such systems in all other sections of the country.

WIRELESS TELEPHONY AT ST. LOUIS.

AN attraction of especial interest to telephone men visiting the Exposition will be the demonstration of wireless telephony, by means of a search light. Advantage has been taken of the peculiar phenomenon that when a telephone circuit is superimposed upon an arc light circuit variations in the telephone circuit cause the arc light to increase or decrease in intensity. By means of a proper reflector, a beam of light is focused upon a selenium cell which is in circuit with a receiver and a battery. The operation is as follows: Variations in the intensity of the reflected beam of light due to the current at the sending end, tend to increase or decrease the resistance of the selenium cell, which in turn allows a varying current to flow through the receiver, and so duplicate the vibrations of the distant transmitter.

TELEPHONE



PATENTS

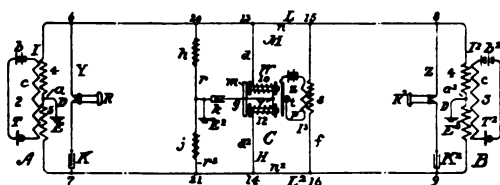
AUTOMATIC TELEPHONE SYSTEM.

J. C. Slater, St. Louis, Mo., patents (No. 760,711), an improved automatic telephone system. This invention relates to telephone systems which operate without the intervention of a central office, in which each subscriber is enabled to call every other one connected with the system. The inventor provides at each substation a graduated disc so arranged that when it is operated a series of impulses are transmitted over the line, that actuate step by step mechanisms or selectors placed at each substation.

TELEPHONE RELAY.

J. J. O'Connell, Chicago, Ill., patents (No. 760,143), an improved telephone relay and assigns to the American Telephone and Telegraph Company. The salient features of Mr. O'Connell's invention are embodied in the circuit shown herewith. In this circuit *A* and *B* are the two substations at each of which transmitters *T* and *T*₂ are located. These transmitters are connected in series with a battery *b* and the primary winding of the induction coil *c*.

From the substations two lines extend *L* and *L*₂. At each substation the secondary winding of the induction coil is arranged in two parts with a ground *E* at the center. At any point *M* between the substation the repeating device is placed. This consists of a pair of coils *10* and *11*, bridged across the metallic lines



L and *L*₂. The cores of these coils are placed in front of the iron diaphragm of a transmitter. An inspection of this circuit shows that it performs a double office by means of the ground at the center of the induction coil and at the center of the repeater coil. The two sides of the line are used in parallel and the impulses set up by the transmitter at either substation pass over both sides of the line and return by the ground. These impulses then affect the cores of the coils *10* and *11* precisely as they would an ordinary receiver. The varying magnetism in these coils causes corresponding variations in pressure on the transmitter and thus enable this transmitter to repeat the impulses which the substation transmits. The impulses thus repeated circulate round and round the metallic circuit formed by the two wires *L* and *L*₂ in series, and it will be seen that in this circuit the two portions of the secondary windings of the induction coil at each substation are joined in series and operate as an impedance, thus forcing the voice currents to pass through the receivers *r* and *r*₂, which are bridged across the line at each substation. By means of this circuit, therefore, the voice currents from each substation can be reinforced by the repeater joined at the center of the circuit and thus strengthened for reception at the remote end.

SELECTIVE SIGNAL SYSTEM.

F. C. Penfield and O. Templin, of Lawrence, Kansas, patent (No. 760,399), a system of selective signalling. The inventors propose to use each side of a metallic line and ground for the signalling circuit and to supply to the switchboard a set of keys whereby either positive or negative continuous current, positive or negative pulsating current, or alternating current, may be supplied to either side of the line at pleasure and thereby ten different methods of signalling are secured.

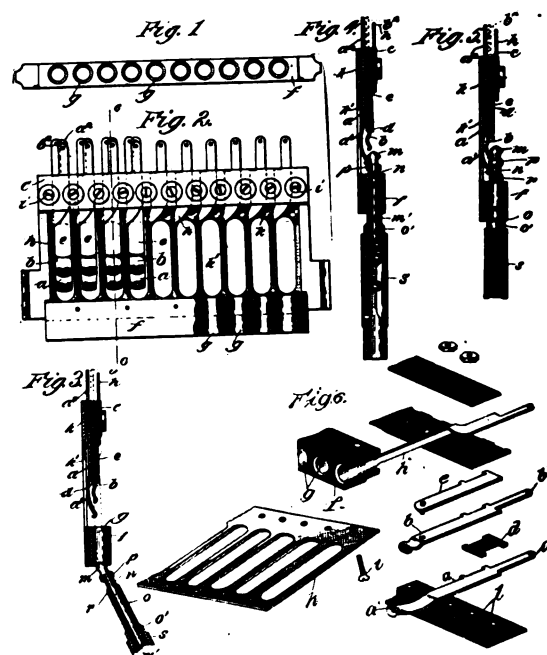
IMPROVED TELEPHONE RECEIVER.

M. R. Hutchison, of Norwood, N. J., patents (No. 758,363) an improved telephone receiver and assigns to the Hutchison

Acoustic Company, New York. In this device the inventor attaches the diaphragm solidly to the cap of the receiver and then by means of a screw, which secures the cap to the receiver body, arranges the diaphragm to be adjustable and by this means claims to enable the receiver to give the greatest possible volume of sound.

IMPROVED PLUG AND SPRING JACK.

F. R. McBerty, Evanston, Ill., patents (No. 760,549) an improved plug and spring jack, and assigns to the Western Electric Company. This invention is illustrated in Figs. 1 to 6, inclusive. Fig. 1 is an elevation; Fig. 2, the plan view partly in section; Figs. 3, 4, 5 and 6 are various details. The long and short line-springs *a b* are mounted one above another in a rear insulating strip *c*. To the ends of the springs the wires of the circuits are attached. A strip of hard rubber *d* extends between the two springs *a b* and



separates them. A stop *e*, having little elasticity, is placed between the springs. The thimble *g* is embedded in a block of insulating material *f*, having an extension *h*, to pass through the block *c*. All parts are held firmly together by the bolts *i i*. The plug has a tip *m* of aluminum bronze connected to the line by the rod *m'*. The contact *n* is composed of a small metal tube surrounding the rod *m'*, but insulated therefrom and embedded in insulating material separating it from the shank *o*. A metal shoulder *p* is placed between the tip and ring contacts embedded in hard rubber to take the wear. A special feature is that the tip is of considerably smaller diameter than the shoulder. This plug has the advantage that when it is inserted in the spring jack, the tip makes contact with the thimble first, but when the plug is inserted a little farther so that the shoulder *p* enters the jack, the tip may still be in contact even if the plug is at an angle. When the hard rubber shoulder *r* engages with the thimble, the axis of the plug is thrown into a straight line with the axis of the jack, and the shank of the plug coming in contact with the thimble prevents any rocking which will allow a contact with the tip.

IMPROVED RECEIVER SUPPORT.

George A. Cowgill, Euphemia, Ohio, patents (No. 761,150) an improved attachment for supporting receivers. The object of this invention is to provide a swinging arm to which a telephone receiver may be attached, and whereby it may be supported at a convenient point with reference to the ear of the user of the telephone, so that it is unnecessary to hold the receiver constantly in the hand.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



SELF-RESTORING DROP.—(349.)

Will you please give in your query column a description of a self-restoring drop. N. Y. S.

There are a number of self-restoring drops designed to operate with battery current, one of which is shown in Fig. 349. The drop is composed of two separate and distinct magnets, *S* and *K*, of which *S* is the line and *K* the restoring magnet. When a subscriber signals the armature *A* is pulled up, releasing the armature

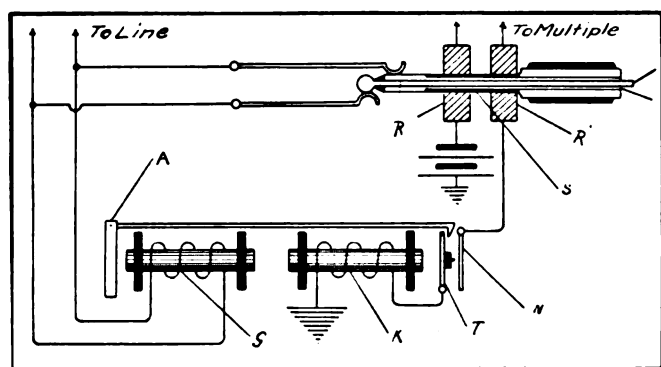


Fig. 349.

T, which in falling pushes the shutter *N* outwards, calling the operator's attention. When the operator puts her plug in the jack the portion of the sleeve marked *S* short circuits the two thimbles of the Jack *R* and *R'*, closing the circuit of the magnet *K*, which then draws up its armature, *T*, to its original position. It will be noticed that when the drop is restored the restoring circuit is opened, thus preventing a waste of battery current.

PHANTOM CIRCUIT.—(350.)

Our exchange is wired for metallic circuits. There are two lines running parallel along a route where we have a new subscriber. Now can't we use, say, the odd wire of one circuit and the even wire of the other for the new telephone, without building an additional line? Will there be any interference with the other two lines? R. H. P.

To use one wire of one circuit and one of the other would be impractical since, supposing one party called *A* was using their line, that side of the circuit which was used for the phantom would be in parallel with the other wire of the phantom which forms one side of the second party, *B*'s, circuit, consequently if the party on the phantom wished to use his telephone he would hear the *A* party with more or less distinctness, according to the length of the lines. Query No. 334 illustrates one method of connecting up a phantom or simplex circuit. Such circuits are not generally used except on long lines where the expense of running a new circuit would be very high because of the cost of the apparatus and the complication of the switchboard circuits. Besides, it is very difficult to balance the lines to insure a clear wire free from noise.

CABLE PROTECTION.—(351.)

Which would be the safest way to protect a cable sheath against a 2,200 volt electric light circuit, especially where the cable is on electric light poles? Should the cable be below or above? Should a cable containing all metallic circuits have its sheath grounded or not? Why? A. K.

Replying to your inquiry, we beg to advise you that it is generally customary to run low-tension lines below high-tension lines when the two are placed on the same pole. See reply to Query No. 345 in our last issue. It is best to thoroughly ground the sheath of the cable of which you speak. If this is done and a

cross occurs with the high-tension line, it is probable that the bulk of the current will be taken into the earth, and thus the terminal boxes or other appliances upon the end of the cable will be protected if the high-tension wire carries sufficient current, so that in case of a cross with a cable there will be enough electricity to melt the cable sheath.

There is no known means of protection excepting that of preventing a contact between the high-tension wires. It is possible to accomplish this by placing some kind of net-work or guard wires between the high-tension line and the cable. If the high-tension wire carries but a small amount of current it is not likely to injure the cable sheath, in case of a cross, excepting possibly by burning a small hole in it. All of the conductors in the cable should have a complete set of protective devices, consisting of lightning arresters, spark gaps and heat coils at both ends of the cable.

SIMULTANEOUS TELEPHONY AND TELEGRAPHY.—(352.)

We have a toll line forty miles long between two important cities. We have considered adapting it to a telegraph circuit and letting the service. We have heard of such an arrangement. Is it practical R. TEL. CO.

Simultaneous telegraphy and telephony has been accomplished but only with the aid of an expert. There are many things to be considered which tend to complicate such a system, the worst of which is balance. Unless the apparatus was perfectly balanced the line would be very noisy, and in all probability inoperative for a telephone circuit.

DIFFICULTY IN RINGING.—(353.)

We have a farmers' line which is about six miles long and has about ten instruments bridged across. Now the bells are all 1,000 ohms resistance, but we have trouble in getting a good ring at the distant stations. What is the trouble? G. K. T.

If your line is iron the trouble is due to the increased resistance of each successive loop and in consequence the distant bells are getting less current than the ones nearer the exchange. A more powerful generator would probably remedy your trouble, although ringers with about 1,500 ohms resistance would cause a more even distribution of current along the line.

ELECTROLYSIS.—(354.)

Will you please illustrate in a simple manner the cause of street-railway current affecting telephone cables. L. N. T.

In the current issue of this paper there is an article which deals very thoroughly with the electrolytic action of street railway current upon underground metallic structures, but the accom-

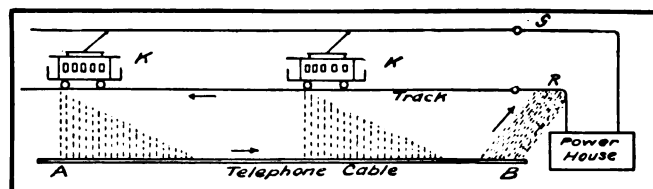


Fig. 354.

panying sketch, Fig. 354, may make this phenomenon clearer to you. *S* represents the feeder to the trolley wires and *R* the return from the track to the power house. The dotted lines show clearly the course of the current from the cars and track to the low-resistance conducting sheath of the cable. At *B*, where the current leaves the cable to return to the power house, is where the destructive agency of the street-railway current is effected.



THE WEEK'S MESSAGES

FINANCIAL.

BURLINGTON, IA.—The Burlington & Augusta Telephone Company, originally organized as a single line between the two towns, has developed into such a large enterprise that it is now planned to reincorporate it with increased capital. The present capitalization is \$5,000. The extensions made and others contemplated will justify a capitalization of \$20,000. The company now has thirteen lines leading into the city, and one more is to be added in the near future. It has 148 subscribers. The officers are: E. W. Ramkey, president and manager; Henry Magel, vice-president and assistant manager; N. C. Hansen, secretary and treasurer.

ELKADER, IA.—J. J. Cann, an official of the Interstate Telephone Company, states that arrangements have been made for the construction of two new lines from this place. One line into Highland Township, with ten telephones, and the other to Mederville, with fifteen telephones.

LUANA, IA.—The Luana & Monona Farmers' Telephone Company has increased its capital stock from \$2,500 to \$5,000.

VINTON, IA.—The Mutual Telephone Company, of Vinton, Benton County, has increased its capital stock from \$2,000 to \$10,000.

LOCONIA, N. H.—The Citizens' Telephone Company, of Loconia, has increased its capital stock to \$80,000.

BELLEVILLE, O.—The United Telephone Company, of Belleville, has increased its capital stock from \$214,800 to \$300,000.

CALDWELL, O.—The Caldwell Independent Telephone Company has increased its capital stock from \$5,000 to \$50,000.

CLEVELAND, O.—The April statement of the United States Telephone Company, showing net earnings for the month of \$15,696.34, or over twice the amount necessary to pay the bond interest. The net earnings are \$2,000 greater than the net earnings of April, 1903, showing a phenomenal gain. After deducting bond interest and preferred stock dividend there is \$7,580 surplus for common stock, which is at the rate of \$91,000 a year, or 4½ per cent. on the outstanding stock.

CLEVELAND, O.—The Cuyahoga Telephone Company's gross earnings for the month of April were \$33,559.62. Net earnings, \$13,899.07.

ANDERSON, S. C.—The Anderson Telephone Company has filed an amendment to its charter, increasing its capital from \$16,000 to \$30,000. G. E. Evans, W. R. Osborne, and others, are the directors.

OSSEO, WIS.—The Osseo Telephone Company, by C. F. Trager, president, and O. J. Hawkinson, secretary, has filed an amendment increasing its capital stock from \$10,000 to \$25,000.

FRANCHISES.

BLAKELEY, GA.—W. H. Powell, manager of the Blakeley Telephone Company, appeared before the city council of Albany, seeking a franchise for his company, which desires to enter Albany with long distance connections between a number of towns and cities in southwestern Georgia and southeastern Alabama.

HOOPESTON, ILL.—U. S. Thompson, of this place, has been granted a franchise at Villa Grove for the construction of an independent telephone system. He expects to start with about 100 subscribers.

MARCA, ILL.—The Farmers' Interstate Telephone Company has been granted a franchise to construct a system in this place.

MEXICO, MEX.—The concessions held by Jose Sitzenstaller from the Federal Government and from the City Council, for the construction of a telephone system in the City of Mexico and the other towns situated in the Federal District, have been extended for a further term of six months from May 4th, in which to commence work.

ALBERT LEA, MINN.—The Manchester Telephone Company has asked the City Council for a franchise to construct a system here.

GLENCOE, MINN.—At a special meeting of the City Council, a franchise was granted the Norwood-Young America Telephone Company to construct a telephone line and toll station in this village. The company has direct connections with the Twin City Telephone Company.

GENESE, N. Y.—The Board of Trustees have granted the InterOcean Telephone Company of Buffalo the privilege of entering and constructing a system on the streets of this village.

EL PASO, TEX.—A franchise has been granted the Southern Independent Telephone Company to do business in this city.

ELECTIONS.

GRINNELL, IA.—The Interior Telephone Company has elected the following officers, all of Grinnell: E. A. Marsh, president; L. F. Parker, vice-president; W. S. Hendrixson, secretary; C. N. H. Beyer, treasurer; J. P. Lyman, W. F. Wilson, and C. R. Clark, directors.

LA CROSSE, WIS.—The new directors of the La Crosse Telephone Company, have elected the following officers: I. H. Moulton, president; W. W. Gargill, vice-president; W. F. Goodrich, secretary and treasurer.

COMBINATIONS.

TAMPICO, IND.—The Jackson Telephone Company has sold out to the Brownstown Telephone Company.

CHARLESTON, S. C.—The Island Telephone Company, formerly operated in connection with the Gordon Telephone System, has been sold at auction to C. E. Gibbon, a broker, for \$8,200 cash. Mr. Gibbon declined to state who would operate the company in the future.

PALMER, KANS.—G. G. Hostutler, of this place, and Henry Meierkord, of Linn, Kans., are arranging for the consolidations of telephone systems in the two towns, the new concern to be known as the Twin Telephone Company.

PERSONAL.

J. L. W. V. JENSEN, chief engineer of the Copenhagen & Seeland Telephone Company, and Fr. Johannsen, general manager of the same company, have inspected the Cuyahoga Telephone Company's plant at Cleveland. They were interested particularly because their plant in Denmark is constructed on the same plan of engineering. They are touring this country gathering ideas for the betterment of their plant.

J. B. WARE, of Grand Rapids, Mich., is now special representative of the Automatic Electric Company of Chicago, Ill.

E. C. WARNER has been appointed superintendent of the Kentucky division of the Gainesboro Telephone Company, at Glasgow, Ky.

EARL TALBOT, of Linton, Ind., has been appointed successor to J. F. Slinkard, resigned, as manager of the Greene County Telephone Company.

E. P. WILBUR, manager of the Melford, Mass., telephone exchange, has been promoted to the managership of the exchange at South Framingham.

MISCELLANEOUS.

MENA, ARK.—The Kizer Telephone Company, of this city, having a capital of \$50,000, has been granted a permit to do business in Texas.

PANAMA, C. A.—An American syndicate has secured control of the telephone system, together with the electric light and tramway plants along the canal.

COLUMBUS, GA.—The Southern Telephone Construction Company, which installed the new automatic system here, has completed its contract and turned the system over to the company. John T. Norman is president of the home company. The contract with the construction company called for 700 telephones in actual operation. This has been exceeded by 300, and 1,000 instruments will be in operation within two weeks.

BRADFORD, ILL.—The Milo & Bradford Telephone Company has changed its name to the Buda-Bradford-Milo Telephone Company, and the principal office changed from Milo to Bradford.

GRINNELL, IA.—The Interior Telephone Company will have an expert here from the Stromberg-Carlson Telephone Manufacturing Company to make all necessary repairs in the plant, and to correct any trouble that may exist in both the rural lines and company's lines. The company has all the modern improvements for giving good service.

MODALE, IA.—The Interstate Telephone Company has connected with the Woodbine Telephone Company six miles east of Mondamin, which greatly improves the telephone service from here to Logan, Woodbine and Dunlap.

POPLAR BLUFF, MO.—The Poplar Bluff Telephone Company has installed a 600-line common battery switchboard, with 400 lines equipped.

FLEMINGTON, N. J.—The Farmers' and Merchants' Telephone Company has completed its lines to the following places in this county: Whitehouse, Whitehouse Station, Pottersville, Mendham, Gladstone, Peapack, New Germantown, New Hope, Lambertville, Stockton, Idell, Kingwood, Sergeantville, Ringoes, Locktown, Croton, Flemington, Rosemont, Three Bridges, Baptisttown, Frenchtown, Milford, Bloomsbury, Little York, Mt. Pleasant, Everittstown, Pattenburg, Quakertown, Pittstown, Clinton, Annandale, Lebanon and Potterstown.

YAZOO CITY, MISS.—The Mutual Company's telephone exchange was destroyed by the recent fire. The loss is about \$2,500.

GREENFIELD, IND.—The Greenfield Telephone Company's exchange was damaged by fire on May 26th. Two cables, besides a fuse board, were destroyed by a recent fire. The loss is about \$2,500.

NEW COMPANY NOTES

BIRMINGHAM, ALA.—The Smith County Telephone Company has been incorporated with a capital stock of \$30,000. The headquarters will be at Taylorville.

FAIRHOPE, ALA.—The Eastern Shore Telephone Company, capital \$3,000, has been chartered here to install telephone lines in Baldwin and Mobile counties. The incorporators are: C. L. Marshan, J. Stapleton and S. S. White.

ASSUMPTION, ILL.—The Assumption Telephone Company has been incorporated with a capital of \$2,400. The directors are S. S. Shafer, S. J. Long, and others.

BONAPARTE, IA.—The Farmers' Connective Telephone Company has been incorporated with a capital of \$10,000, to give telephone service in this vicinity. The officers are J. W. Batchelor, president, and D. R. Hornbaker, secretary.

POSTVILLE, IA.—The Postville & Frankville Telephone Company has been incorporated with a capital stock of \$3,000, to erect and operate a mutual telephone line at Fritz Camp. The officers are: F. M. Meyer, president; F. H. Pleister, secretary and treasurer; directors, F. Sebastian, C. F. Gordon and O. Malby. Corporate period, 20 years from May 31, 1904.

GOLDEN, ILL.—The German Telephone Company was incorporated recently for \$10,000. The stock sells at \$25 per share. The principal office will be in Golden, Ill. The following directors were elected: A. Bartlett, M.

Gronewald, J. Gerjets, D. G. Buss, M. E. Aden, F. Franzen and Diederick Furhken.

DEALESVILLE, KY.—The Dealesville and Solitude Telephone Company has been organized, to give telephone service in this vicinity.

JUNCTION CITY, KY.—A telephone company has been organized here by Dr. J. R. Steele, R. H. West and J. D. Shelby.

CLAREMONT, N. H.—The Independent Telephone Company, of Claremont, Sullivan County, has been incorporated with a capital stock of \$100,000, to give telephone service to all towns in the county. 1,400 subscribers are expected for a start, of which 600 will be in Claremont.

CLINTON, N. C.—The Sampson Telephone Company has been organized here, to build a telephone line from Roseboro by way of Salem to Clinton. R. M. Royal, of Owensville, is secretary and treasurer.

LEBANON, TENN.—The Independence Telephone Company has been chartered here, with a capital stock of \$100,000. W. C. Arrington, J. P. Belcher, H. R. Bryan, D. E. Seay and C. B. Murphy are the incorporators.

HOUSTON, TEX.—The Phoenix Telephone Company has been organized here to construct and operate telephone systems.

SEYMOUR, TEX.—The Profit Telephone Company, of Seymour, Tex., capital stock \$40,000, has been chartered to construct and maintain telephone

lines in the counties of Baylor, Archer, Wichita, Wilbarger, Foard, Cottle, Motley, Floyd, Hale, Lamb, Bailey, Cochran, Hockley, Lubbock, Crosby, Dickens, King, Knox, Young, Throckmorton, Haskell, Stonewall, Kent, Garza, Lynn, Terry and Yoakum. Incorporators: J. W. Profit and John H. Profit, of Profit; W. H. Hayter and W. E. Bailes, of Seymour.

UNDERGROUND.

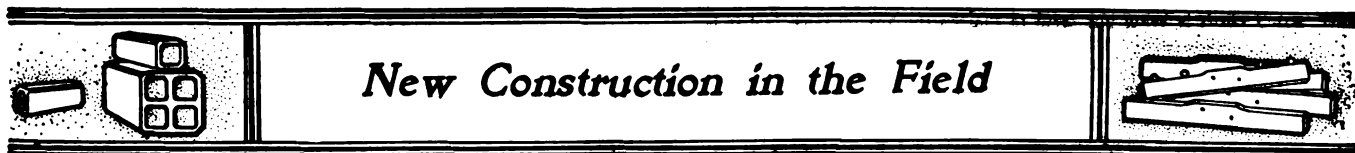
PADUCAH, KY.—An ordinance has been prepared and will be introduced to the Board of Aldermen, to require all telephone wires in the city to be put underground.

CARO, MICH.—The Valley Telephone Company will install an underground system here.

BATH, N. Y.—The Village Board has granted the directors of several rural telephone lines entering the village permission to put their wires in an underground conduit through Liberty street.

BINGHAMTON, N. Y.—Permission has been granted the York State Telephone Company to construct a subway for 200 feet in Chenango street.

WILKESBARRE, PA.—The Council has introduced an ordinance requiring all telephone and telegraph wires to be placed underground in certain streets.



SAVANNAH, GA.—The Georgia Telephone Company is overhauling its system here and at Tybee.

KENWOOD, MO.—Thos. Jeffries is installing a new switchboard here for the Kenwood Telephone Company.

CEDARVILLE, ILL.—The Cedarville-Stephenson County Telephone Company is arranging for the early construction of its system.

NEPONSET, ILL.—The Osceola-Neponset Telephone Company is making arrangements for the construction of a line into Kewanee.

DALEVILLE, IND.—The Daleville Telephone Company's construction work has been completed and would have been in working order if the switchboard people could have furnished equipment fast enough. They will build twenty-five miles of pole line in all directions to reach the farming element.

MEDFORD, IND.—The Mt. Pleasant Telephone Company will complete its construction this week. It will have about one hundred farmers and fifty city telephones. It expects to be in operation by June 11th. It will have two direct trunk lines connecting with Muncie.

MUNCIE, IND.—The Delaware and Madison Counties Telephone Company is building thirty miles of farm lines in all directions out of Elwood, which will connect 200 farmers. It is also building forty miles out of Anderson, which will enable it to connect up 235 farmers. It expects to build in the neighborhood of twenty-five miles of farm lines out of Muncie this season, and about fifteen miles of pole lines out of Alexandria. The cable capacity in Muncie, Anderson, Alexandria and Elwood is exhausted, which will require it to put in the neighborhood of 150,000 feet of cable.

MUNCIE, IND.—The Delaware and Madison Counties Telephone Company is rapidly extending its system, and will install 50,000 feet of aerial cable.

SO. WHITLEY, IND.—The Farmers' Mutual Telephone Company is rapidly increasing its system, having secured 100 new subscribers at Larwill.

ARGYLE, IA.—Senator Young's Telephone Company expects to construct a line from Argyle to Mooar.

ELDRIDGE, IA.—A new telephone line will be built from this place, running west through Maysville and Hickory Grove.

ESTERVILLE, IA.—The Western Electric Telephone Company is extending its system in all directions to accommodate the growing demand for telephone service.

SIMPSON, KANS.—The Mutual Telephone Company, of this town, is extending its system and building a line to connect with the mutual company at Scottsville.

CONCORDIA, KANS.—The Concordia Telephone Company is building a No. 10 copper circuit to connect with the Abilene Company for Kansas City service.

BELOIT, KANS.—The Solomon Valley Telephone Company has built thirty-eight rural party lines, radiating from Beloit and covering nearly the whole of Mitchell County, with the exception of Glasgow and Cawker. A No. 10 copper circuit connects Beloit with Downs, giving a direct all-copper circuit to Kansas City.

GLEN ELDER, KANS.—A telephone company has been formed here to build farmers' lines in the vicinity and to connect with the Mutual Company's system.

RHINEHART, KANS.—The Rhinehart Telephone Company has completed its system here and has a toll line to Chapman.

WEST MORELAND, KANS.—The West Moreland Telephone Company will construct a line to Olsburg by way of Fostoria. At the latter place connection will be made with the Jones line to be built up Spring Creek, and at Olsburg connection will be made with the Currie line. The switchboard will be installed at Wheaton and the lines extended from that place into the country in different directions.

PARRAL, MEXICO.—Weisel and Kok, of this place, will install a telephone system in Jiminez, Mexico.

COLDWATER, MICH.—The Himebaugh Telephone Company is building a line from Batavia to Hatmaker.

CHASKA, MINN.—The Minnetonka Telephone Company is building new lines in Excelsior and vicinity.

EVELETH, MINN.—The Masaba Telephone Company will soon begin reconstruction work on the lines centering at Eveleth and Virginia.

JANESVILLE, MINN.—The local telephone lines are being extended south in Freedom township.

KANDIYOHI, MINN.—The Kandiyohei Telephone Company will extend its lines to Danube and Renville.

LERDAL, MINN.—Farmers in this vicinity have organized a telephone

CARROLLTON, MO.—The Missouri Valley Long Distance Company is building a line from here to Kansas City by way of Excelsior Springs.

MISSOULA, MONT.—The telephone line between here and Bonner is being reconstructed. A new line is to be constructed to Grass Valley and an exchange installed at Hamilton.

WISSNER, NEB.—The Cumming County Independent Telephone Company is extending its system in Blaine township, where it has secured a number of new subscribers.

LACONIA, N. H.—The Citizens' Telephone Company is considering a new line from Laconia to Meredith Village.

HOBOKEN, N. J.—The Delaware, Lackawanna & Western Railroad is arranging to equip its system with the telephones, extending from Hoboken, the eastern terminus of the road, to Buffalo, and from Binghamton, N. Y., to Utica and Syracuse.

WINDSOR, N. J.—The Farmers & Traders' Telephone Company will build a line here this summer.

BINGHAMTON, N. Y.—The Lackawanna R. R. Company will extend its telephone system, which now runs from Hoboken to Elmira, to Utica and Syracuse.

MEDINA, N. Y.—The Home Telephone Company, of Albion, which was recently organized by Rochester and Albion capitalists, has commenced work on its new plant and expects to be doing business by the middle of July.

PENN YAN, N. Y.—The Wayne and Hammondsport telephone line is nearly completed. Connections will be made with the Inter Ocean at both Wayne and Dundee.

SMYRNA, N. Y.—The Sherburne Telephone Company is extending its system on account of increased business.

WATERLOO, N. Y.—The Seneca County Home Telephone Company has connected its line with Geneva, and now announces a long distance service to all points west, while in Waterloo and Seneca Falls it has extended its system until there are 198 telephones in Seneca Falls and 123 telephones in Waterloo.

BUFFALO, N. D.—The Buffalo Telephone Company has commenced building its line, which will reach into the entire southern section of the county.

GRAND FORKS, N. D.—E. H. Moulton and other officials of the Twin City Telephone Company are in this city, arranging to begin construction work on the local system. It is planned to have it in operation by October 1.

GRAND FORKS, N. D.—The Tri-State Telephone Company's long distance line between Minneapolis and Grand Forks, and the Grand Forks exchange of that company will be in operation by the first of October. The work of building the long distance line between Minneapolis and Grand Forks is well under way, about forty miles of the line being completed, while the work is moving along at the rate of a little less than five miles per day. The new line is being built from Minneapolis to Breckenridge, by way of Litchfield, and from Breckenridge will be run directly north to Grand Forks.

KENSAL, N. D.—A new telephone exchange is to be installed here.

KULM, N. D.—The local telephone line is to be extended to Wishek and Ashley.

COLUMBUS, O.—D. A. Walker, of Columbus, O., and associates, have purchased the exchanges of the Tyler Telephone Company and the Globe Telephone Company, of Tyler, Tex. The exchanges will be enlarged.

MT. VICTORY, O.—The Mt. Victory Telephone Company is arranging for the construction of a great many new farmers' lines.

ALTOONA, PA.—The Morrisons County Telephone Company will build a line from Martinsburg to Williamsburg.

BEDFORD, PA.—The Bedford-Fulton Telephone Company has decided to extend its lines through Ground Hawk Valley. The work on the Bedford-Fulton line between Everett and Hopedale is progressing rapidly.

MEADVILLE, PA.—The Meadville Telephone Company is building a line to Hammondsburg.

OXFORD, PA.—The West Jersey Telephone Company has extended its lines from here to Washington.

PITTSBURG, PA.—Officials of the Pittsburgh & Allegheny Telephone Company have made a personal inspection of the operating end of the company, with a view of considering plans for extending the lines.

BERESFORD, S. D.—Work has commenced on the new rural telephone line, which will connect Beresford with the farming region southwest of town. During the summer the line will probably be extended to other parts of the county.

WALLA WALLA, WASH.—A new telephone line is being built from Crescotte to Lochette and Riverside and Walla Walla, and will be extended to Waitesburg.

TRADE NOTES

THE F. BISSELL COMPANY, Toledo, O., has recently received some nice orders from the United States Government for its cable sheath knives, which were advertised in our issue of May 28th.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., is to double its capital stock. A new building has been added and new machinery installed, costing nearly \$50,000, which has been paid out of the surplus profits.

THE NEWARK TELEPHONE EXCHANGE, Newark, N. Y., advises that work has commenced on installing its new common battery visual signal switchboard, recently ordered from the Century Telephone Construction Company, of Buffalo.

THE VOUGHT-BERGER COMPANY, of La Crosse, Wis., whose factory was damaged by fire last week, reports that shipments will not be delayed longer than a week, and trusts that its patrons will not become impatient due to the delay. Every effort is being put forth to shorten the loss of time, and it is expected that, by the aid of additional help and extra shifts, to complete all orders at the earliest possible moment.

W. S. SEAMAN & COMPANY, Milwaukee, Wis., are manufacturers of an exceptionally attractive and satisfactory line of telephone booths. The attention of our readers is called to a statement in their advertisement in this issue, offering special inducements for any orders received in response to this advertisement. This being so, it will pay to get their catalogue and prices if in need of telephone booths, or if contemplating their installation.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, of Chicago, reports an extraordinary demand for its magneto call type, self-restoring signal switchboard. This includes drop shutter, visual and lamp signaling systems. It has also recently secured orders and built toll line switchboards for a number of long distance telephone companies, among which may be mentioned the following exchanges: St. Joseph, Mo.; Albany, Mo.; and Excelsior Springs, Mo.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, of Meriden, Conn., report the most prosperous year of business in its history. It has moved into its new and modern factory, and its 1903 models are perfection in mechanical construction and finish. The company's prosperity is no doubt due to the high-class articles it is making. Its products are the best that skill and money can produce. Its new and large catalogue and various bulletins will be sent on request.

THE KNICKERBOCKER CONSTRUCTION COMPANY, of 15 Cortlandt street, New York, has been organized by Ellis B. Barker and W. M. Anthony, of New Haven; L. B. Wheelodm and J. W. Cushing. It will build conduits, aerial and underground cable lines, and install submarine cables, and all other kinds of electrical construction. This company is the sole licensee of the Grinnell patent cable hauling machine. It has already secured and is working on several large contracts, one of which is the laying of 50,000 feet of duct for the Edison Electric Illuminating Company, of Brooklyn, New York.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., is building switchboards and additional switchboard equipment for Newark, O.; Francesville, Ind.; Janesville, Wis.; Waverly, O.; Flat Rock, Ill.; Brodhead, Wis.; Austinburg, O.; Newton, Ill.; Carson City, Mich.; and is furnishing its various types of combined cross-connecting rack and protectors to the exchanges at Newark, O.; Centerburg, O.; Gambier, O.; Wilkshire, O.; Baltimore, Md.; Sheboygan, Wis.; Danville, Ill.; Lebanon, Ind.; Cleveland, O.; Wayne, Neb.; Coshocton, O.; Donora, Pa.; Louisville, Ky.; Ardmore, I. T.; Portland, Me.; Dexter, Mich., and Wessington Springs, S. D.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Chicago, Ill., and Rochester, N. Y., has issued Bulletin No. 11, which supersedes Bulletin No. 4. This bulletin deals entirely with telephone instruments and accessories, special attention being given to its four party selective signaling system, the new type No. 4 transmitter, and the two styles of receivers the company manufactures. This bulletin is gotten up in a most artistic manner and is bound in the loose leaf manner, so that additions can be inserted as received. Besides describing the apparatus in a most complete manner, diagrams are furnished of important connections.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—The Ottumwa Telephone Company's plant at Ottumwa, Iowa, including Franchise and all its property. The Company owns the three-story brick building, built two years ago, in which is installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing apparatus, all of the latest and the best. 1,250 telephones are installed, with 250 names on the waiting list. The Company also owns 80 miles of toll lines. This is one of the best telephone propositions in the State of

Iowa. For full particulars, maps and photographs, address the Citizens' Savings & Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa. 187

FREE Sample to Agent. Practical ready call device for telephones. Saves brain work and hours of time. Sells itself. One sale sells dozens. Seeing is believing. Send stamp. The Telephone Appliance Co., One Madison Avenue, Dept. A. T. J., New York City. 193

FOR SALE—Switchboards and Telephones, all capacities and makes, Terminals, Cross-connecting Racks, Cable, &c., at less than half cost of new. Guaranteed reliable and efficient. Chicago Telephone Apparatus Exchange, 17 S. Elizabeth St., Chicago, Ill. 184

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL. GILDART BROS., Albion, Mich. 168

SUCCESSFUL and experienced telephone man desires position as manager of Independent plant in the South or West. At present manager of 500-line common battery plant with extensive toll line connections, but desires to leave as his company has been duped into a Bell sub-license arrangement that is objectionable to him. Thirty years old; temperate. Best recommendations from present and former employers. Address, Box 191, AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 191

WANTED—Several A "1" Telephone Solicitors. State salary expected, age, experience; give reference. Address, Box 186, AMERICAN TELEPHONE JOURNAL, New York City. 186

SALESMEN WANTED.—Reliable men to carry as a side line an up-to-date line of advertising calendars sold to furniture hardware, drug, shoe and general merchants. Convenient to carry; prompt remittances. GEO. H. JUNG & CO., Cincinnati, O. 182

POSITION wanted by a practical telephone man as superintendent of a telephone system or as a salesman on the road. Experienced in all branches of operation. Address, Box 195, c/o THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., N. Y. City.

POSITION wanted as superintendent or manager. Thoroughly experienced in magneto and common battery systems. Also with selective party line signaling. Have had charge of right-of-way department for the past two years in a district of five thousand subscribers. Experience gained with Bell company in the East. Address, Box 194, AMERICAN TELEPHONE JOURNAL, 116 Nassau Street, New York City. 194

WANTED—Second-hand Telephone Apparatus, Central Energy and Magneto Switchboards, Telephones, Bridging Bells, Transmitters, Terminals, Cross-connecting and Distributing Racks, Ringing Generators. State details, price, condition and make. C. E. W., 17 S. Elizabeth St., Chicago, Ill. 188

POSITION WANTED—An up-to-date telephone man, with best of reference as to ability and character, would like position in good Southwest town. At liberty August 1st. Address, P. O. Box 340, Cedar Rapids, Ia.

OUR STOCK OF POLES

is being increased daily. Cars are coming in freely from all points. Never had so little trouble on the car question.

Hadn't you better turn that Rush order over to us?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 512 Bessemer Building.

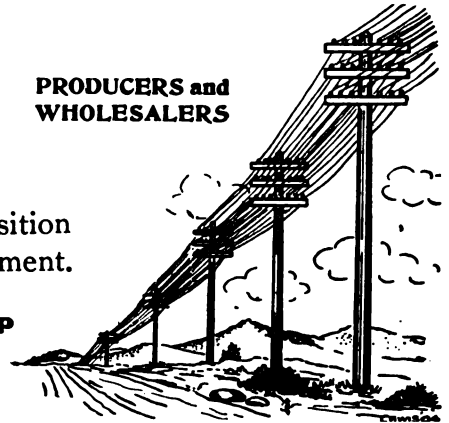
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.



"From the Stump
to the Line."

PRODUCERS and
WHOLESALEERS



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

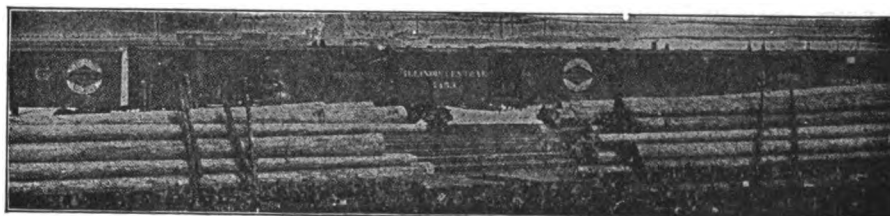
Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock
Prompt Ship-
ment.



LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

JUSTICE MAY BE BLIND—

But Discerning

Pole Buyers

are not. That's why they buy our poles. There are other reasons, too. Why not question us for other reasons and prices?

**SAND POINT
CEDAR CO.**

Sand Point, Idaho

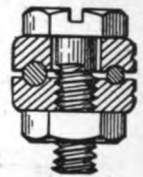


Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

TELEPHONE WIRE TROUBLES AND THE COST OF CLEARING THEM CAN BE GREATLY REDUCED BY USING "H. W. W." WIRE-CONNECTORS



Why make permanent joints at important points in your telephone circuits when a test joint with a thoroughly reliable connector will enable you to test quickly at the cable-box, or at the drop wires—or at intervals on toll wires! The "H. W. W." Connector will fit wires of the same or of different diameters. It has been extensively used by Telephone Companies for several years. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.

The Valentine-Clark Co.

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before for maintaining their prominent position among the leaders in the cedar industry. Making a specialty of Poles, they are identified with the leading producing sections, concentrate their material at advantageous shipping points and are in position for giving their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

YELLOW PINE CROSS ARMS

WE MAKE 'EM

AT FACTORY

Chattanooga Tenn., U. S. A.

Below find price lists of

TELEPHONE ARMS

F. O. B. Factory

Write for prices, delivered anywhere.

Prompt Shipments Always

NAME OF CODE WORD	NO. PINS	LENGTH	SPACINGS			PRICE
			END	Center	SLIDES	
Dennis.....	2	2 ft. 8 in.	8	26		9 cts.
Derby.....	4	3 " 8 "	8	16	10	11 "
Dexter.....	6	5 " 8 "	8	16	10	15 "
Dryden.....	8	6 " 10 "	8	16	10	21 "
Dundee.....	10	8 " 8 "	8	16	10	26 "
Duston.....	12	10 ft.	8	14	10	30 "

When ordering, use Name or Code Word and avoid any possibility of mistakes.

Central Manufacturing Co.

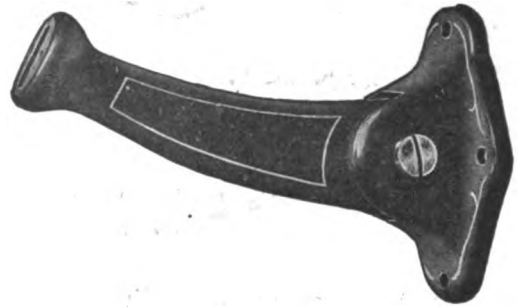
CHATTANOOGA, TENN., U. S. A.

NEW TRUNKSARE NOT AS GOOD AS
EXPANDED**Metal Lockers**

FOR YOUR OPERATORS.

A *Safe and Sanitary* place to leave wraps.
Increases the efficiency of your Exchange.
In use in hundreds of offices. Also**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS****MERRITT & CO.,**

1010 Ridge Ave.,

PHILADELPHIA.**WE HELP TO MAKE**A Good
Telephone

ADDRESS 'BARRARM,' CLEVELAND

**Insulated
Electrical
Wires and Cables****RDEBLING****Bare Steel and
Copper Tele-
phone Wire****John A. Roebling's Sons Co.**
TRENTON, N. J.**NEW YORK
SAN FRANCISCO****Agencies and Branches
CHICAGO
PHILADELPHIA****CLEVELAND
ATLANTA****ADVERTISERS' DIRECTORY—Continued****CONNECTORS.**Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., To-
ledo, O.**CONSTRUCTION SUPPLIES.**American Electric Tel. Co., Chi-
cago, Ill.
Electric Appliance Co., Chicago,
Ill.
Erner Hopkins Co., Columbus, O.
Farr Tel. & Const. Supply Co.,
Chicago, Ill.
Hemmings Glass Co., Covington,
Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Nagel, W. G., Electric Co., To-
ledo, O.
New Haven Novelty Machine Co.,
New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.**CONSTRUCTION TOOLS.**American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago,
Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.**COPPER.**Benedict & Burnham Brass & Cop-
per Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.**CORPORATION RECORD BOOKS.**Middleton & Co., J. W., Chicago,
Ill.**CORRESPONDENCE SCHOOL.**American School of Correspon-
dence, Chicago, Ill.**CROSS ARM BRACES.**

Inland Steel Co., Chicago, Ill.

CROSS ARMS.American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga,
Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.**ENGINEERS and CONTRACTORS.**Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago,
Ill.
Imperial Finance & Construction
Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg,
Pa.
Stanton, L. W., Cleveland, O.**FUSES.**Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette,
Ind.**GERMAN SILVER.**

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.**INSULATING MATERIAL.**Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., To-
ledo, O.
Okonite Co., New York.
Standard Underground Cable Co.,
Pittsburg, Pa.**INSULATORS.**American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Hemmings Glass Co., Covington,
Ky.
Nagel, W. G., Electric Co., To-
ledo, O.**LATHES.**Scribner, A. C., Gloversville,
N. Y.**LINEMEN'S TOOLS.**American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply
Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago,
Ill.
Nagel, W. G., Electric Co., To-
ledo, O.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.**LIGHTNING ARRESTERS.**American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Garton-Daniels Co., Keokuk, Ia.
Nagel, W. G., Electric Co., To-
ledo, O.
Sterling Electric Co., Lafayette,
Ind.
Stromberg-Carlson Tel. Mfg. Co.,
Chicago, Ill.**LOCKERS.**

Merritt & Co., Philadelphia, Pa.

MEASURING INSTRUMENTS.Pignolet, L. M., New York.
Weston Electrical Instrument Co.,
Newark, N. J.**PATENT ATTORNEY.**

Munk, Otto, New York City.

PINS AND BRACKETS.American Electric Tel. Co., Chi-
cago, Ill.
Bissell Co., The F., Toledo, O.Central Mfg. Co., Chattanooga,
Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Nagel, W. G., Electric Co., To-
ledo, O.
Prosser & Son, L., Scottsburg,
Ind.**POLES.**Beidler, Francis, & Co., Chicago,
Ill.
Bissell Co., The F., Toledo, O.
Bushnell, A., Kansas City, Mo.
Churchill, E., Heron, Mont.
Electric Railway Equipment Co.,
Cincinnati, O.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hat-
tiesburg, Miss.
Linsley Bros. Co., Chicago, Ill.
Maltby Lumber Co., Bay City,
Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City,
Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane,
Wash.
Pendleton & Gilkey, Minneapolis,
Minn.
Pittsburg & Lake Superior Iron
Co., Escanaba, Mich.
Sand Point Cedar Co., Sand
Point, Idaho.
Sterling, W. C., & Son, Monroe,
Mich.
Valentine-Clark Co., Chicago, Ill.
Worcester, C. H., Co., Chicago,
Ill.**POLE STEPS.**

Inland Steel Co., Chicago, Ill.

PROTECTORS.American Electric Tel. Co., Chi-
cago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Kellogg Switchboard & Supply
Co., Chicago, Ill.

POLE STEPS

**PLAIN AND
GALVANIZED**



**9-16 X 9, 5-8 X 9, 5-8 X 10
INCH**

Other Sizes Made to Order

**We make our own steel and do our own galvanizing, therefore
lowest possible prices and quick shipment.**

INLAND STEEL COMPANY, CHICAGO First National Bank Building

Cedar Poles

We Have a Large Stock for Prompt Shipment.

LONG POLES a Specialty

Quality Guaranteed Satisfactory.

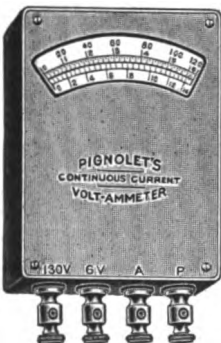
WRITE FOR PRICE NOW.

THE LINDSLEY BROS. CO.
SPOKANE, WASH.

Address all correspondence to
GENERAL OFFICE:
1308 Tribune Building
CHICAGO

LINDSLEY BROS. CO.
MENOMINEE, MICH.

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

OWING to the limited number of copies carried on file and the large demands, back numbers of THE AMERICAN TELEPHONE JOURNAL will hereafter be sold for twenty-five cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

TELEPHONES AND SWITCHBOARDS

Second Hand but Reconstructed

in a manner which guarantees

Original Appearance and Operating Qualities.

One Thousand Exchanges are purchasing reliable apparatus of this Company at reduced prices.

WHY NOT YOU?

Write for Stock List. All Standard and Modern Makes.

Guarantee Telephone and Equipment Company

73 & 75 W. Jackson Boulevard, Chicago, Ill.

CYPRESS POLES Creosoted and Treated with Chloride of Zinc

IF YOU WANT a telegraph pole THAT WILL OUTLAST ANY TWO CEDAR POLES, get the above. No decay. No dry rot. Nothing to give way. Test poles SOUND AFTER THIRTY YEARS. Price on long lengths same as cedar. Short lengths about one-third higher. Address

A. BUSHNELL, 903 Broadway, KANSAS CITY, MO.

Cost of Construction Reduced
By Purchasing Chestnut Telephone**POLES and POSTS**

From **FRANK MULLEN, Ewing, IND.**

Reasons Why for the Asking

Pendleton & Gilkey

816 Lumber Exchange,

Minneapolis, Minn.

POLE PRODUCERS.

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

**LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES**
For Special Use Carried in Full Stocks and
Sold at Reasonable Prices
**THE MEDORA MILLING CO.,
MEDORA, INDIANA**

MICHIGAN CEDAR CO., Ltd.
BAY CITY, MICH.

CEDAR POLES

We aim to please. Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality . . .

PINS--BRACKETS

Let us send you a few reasons
why you should

BUY FROM US

**L. Prosser & Son, SCOTTSBURG,
INDIANA.**

BRACKETS--X ARMS--PINS

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:

Prompt Shipment--Quality Satisfaction--Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.

E. OHUROHILL

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR

POLES

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE CROSS ARMS

Oak Insulator Pins and Brackets



PRINCESS ANNE

MARYLAND

We Make a Specialty of Telephone Poles.	P O L E S	Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines
YARDS: Menominee, Mich. Escanaba, Mich. Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.	FRANCIS BEIDLER & CO.	459-519 W 22d St. CHICAGO, ILL.

J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Manuals
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
167 Dearborn St. CHICAGO.

Blank Books and Forms

**FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.**

Toll Tickets	Receipts for Toll Service
Toll Station Journals	Receipts for Exchange
Toll Station Ledgers	Service
Monthly Check Reports	Lease Records
	Cash Books, &c., &c.

Write for sample forms and prices.

The Telephone Printing Company
DEPLANCE, OHIO

Do you always mention the

American Telephone Journal

when writing to advertisers? It will be
appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART, cross
ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

We've wireless wires and
horseless cabs,
But will we ever own
A cussless, waitless, out-of-
order-less
Girlless telephone?

—Life.

This Is It



See us at St. Louis,
Section 24,
Palace of Electricity.

Thousands have already
declared the Automatic
Telephone the
wonder of the
Fair.

**AUTOMATIC
ELECTRIC
COMPANY**
CHICAGO, U. S. A.

The Erner Hopkins Co. Wholesale
Electrical
Supplies
WRITE US FOR PRICES. WE CAN SAVE YOU MONEY.
The ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
ROME, N. Y.
Chicago Office: 1501 Menadnock Bldg.,
CHICAGO.

Keeling & Ridge Co.
General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
ELECTRICAL ENGINEER
AND CONTRACTOR
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 335, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL, \$250,000.00.
Main Offices, 551-2-3 The Spitzer, **TOLEDO, OHIO.**
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

WESTON STANDARD
PORTABLE
DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Chicago Insulated Wire Co

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill.
Factory, Sycamore, Ill.
PRICE LIST AND SAMPLES ON APPLICATION

Linemen's Outfits
Construction Tools



Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
87 West Van Buren St., CHICAGO, ILL.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices: NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.



P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

To Upper Michigan

Solid train, electric lighted, Chicago to Houghton, Hancock and Calumet, Mich., and thro' sleepers to Marquette, via the

Chicago, Milwaukee & St. Paul Railway.

Leave Union Station, Chicago, 10.30 p. m. daily. Dining car for breakfast.

This is the season to visit the Lake Superior country and this is the way to go.

F. A. MILLER,
General Passenger Agent,
CHICAGO, ILL.

**ELECTRIC
RAILWAY
EQUIPMENT CO.**
MANUFACTURERS OF
IRON AND STEEL
TELEPHONE POLES.

CINCINNATI, OHIO,
U. S. A.
CABLE ADDRESS: "EQUIPMENT"
LEADER CODE USED.
Prices on Application.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

336 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S (Patent)

**CONNECTORS
AND
TERMINALS**

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

COOK PROTECTORS

STANDARD

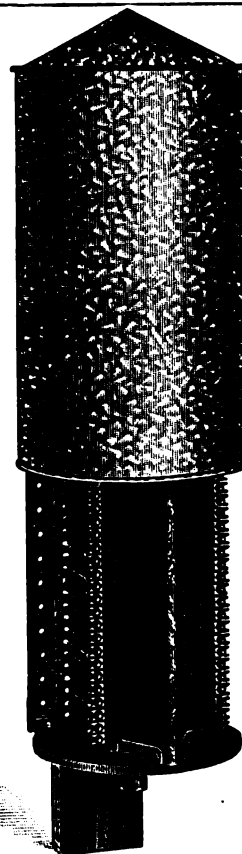


Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF

FRANK B. COOK

240 - 244 W. LAKE ST. CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

ADVERTISERS' DIRECTORY—Concluded

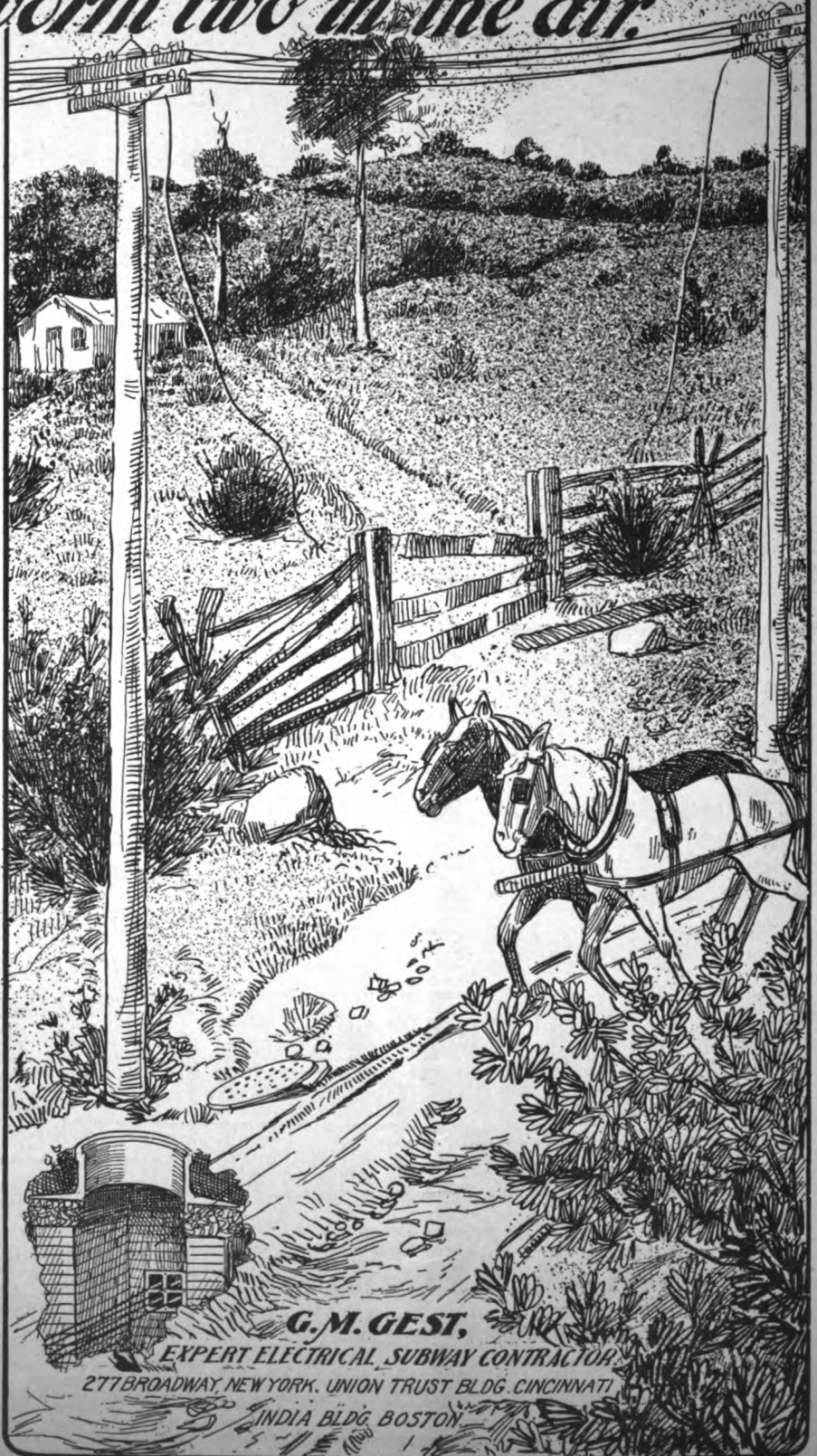
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.
RAILROADS.
Chicago, Burlington & Quincy Ry. Co.
SEALS.
Middleton & Co., J. W., Chicago, Ill.
STATIONERY.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.
STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.
STORAGE BATTERIES.
National Battery Co., N. Y. City.
SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.

Vought-Berger Co., La Crosse, Wis.
TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Telephone Apparatus Exchange, Chicago, Ill.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
De Veau Telephone Mfg. Co., New York.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Guarantee Teleph. & Equipment Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
TELEPHONE BLANKS.
Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.
Seaman, W. S., & Co., Milwaukee, Wis.
Yesbera Manufacturing Co., Toledo, Ohio.
TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.
TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Telephone Apparatus Exchange, Chicago, Ill.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
De Veau Telephone Mfg. Co., New York.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Guarantee Teleph. & Equipment Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Mountain State Electric Co., Wheeling, W. Va.
Nagel, W. G., Electric Co., Toledo, O.

Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.
TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Mountain State Electric Co., Wheeling, W. Va.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
TOLL TICKETS.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.
TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburgh, Pa.
WOOD PRESERVER.
Bruno Grosche & Co., New York.
Bushnell, A., Kansas City, Mo.

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago,

Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

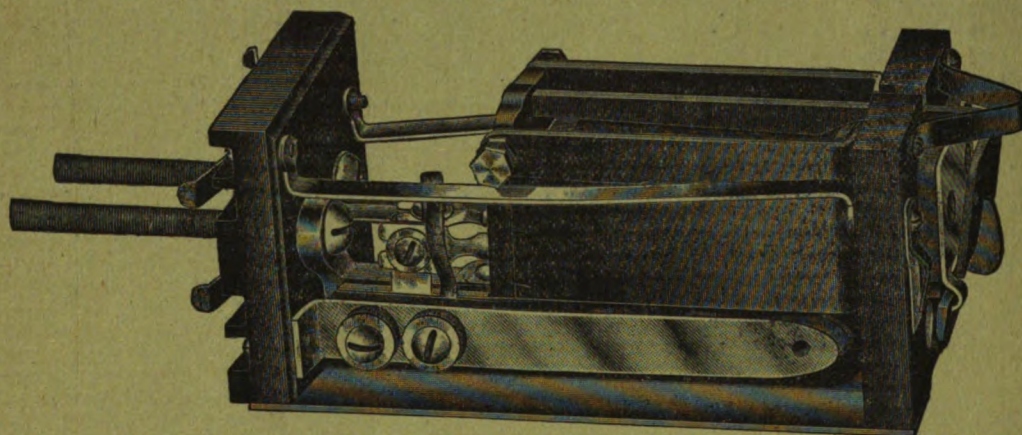
6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

IMPROVED AMERICAN EXPRESS SWITCHBOARDS

BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

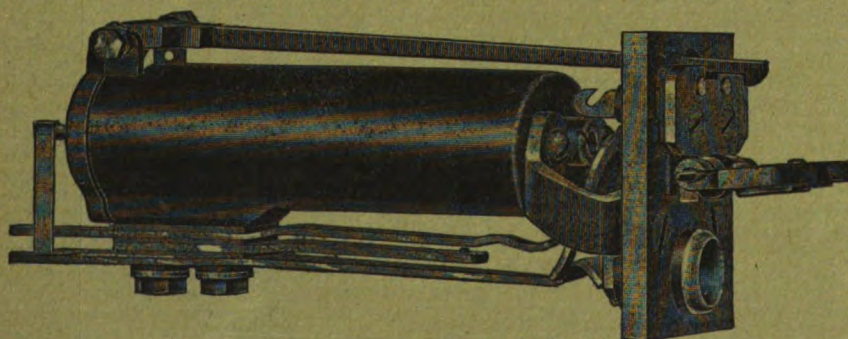
**SELF-CONTAINED DROPS AND JACKS
RAPID RINGING DEVICE**

All drops restored to normal position by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10.



**AT
POPULAR
PRICES**

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

July Digest

THE AMERICAN TELEPHONE JOURNAL

John Wanamaker
Says—

"If there is one enterprise on earth that a 'quitter' should leave severely alone, it is advertising. To make a success of advertising one must be prepared to stick to it like a barnacle on a boat's bottom. He should know before he begins it, that he must spend money—lots of it.

"Somebody must tell him, also, that he cannot hope to reap results commensurate with his expenditure early in the game.

"Advertising doesn't jerk—it pulls. It begins very gently at first, but the pull is steady. It increases day by day and year by year until it exerts an irresistible power."

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—JUNE 18, 1904—CHICAGO Number 25

T h e A M E R I C A N T E L E P H O N E J O U R N A L

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

A TELEPHONE NEWS BUREAUBy Antonio West
SOME REMARKS ON INSTRUMENT SETTING, CABLE BOXES AND DISTRIBUTING HOODSBy B. C. Wilhelm
A TWO-WAY TRUNK CIRCUITBy James R. Gemmill
PRECAUTIONS TO BE OBSERVED IN THE CONSTRUCTION OF INTERSECTING AERIAL LINES.....By C. A. Scott

The Operating Field:

IMPROVEMENTS OF UNITED STATES COMPANY	TELEPHONE ASSESSMENTS IN KANSAS
OMITTED NAME AND NUMBER—SUIT FOR DAMAGES	
PLANS OF QUEEN CITY TELEPHONE COMPANY	SPANISH TELEPHONE STATISTICS
ENLARGED QUARTERS FOR THE TOPEKA INDEPENDENT COMPANY	
ANOTHER INSTANCE OF BELL METHODS	RATES OF BELL AND CUYAHOGA COMPANIES
THE BELL TRIES TO ENTER CRAWFORDSVILLE, IND.	SAN FERNANDO VALLEY, CAL., CAPITULATES
A COMBINATION RING-OFF DROP, by A. S. Liscom	
QUERIES	THE EDITOR'S PAGE
THE WEEK'S MESSAGES	TRADE NOTES
WANT AND FOR SALE ADVERTISEMENTS, PAGE 400	PATENTS.

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

210 LAKE STREET
CHICAGO, ILL.

ECONOMY AND SATISFACTION?

Use the Novelty Cable Sleeves.
Pot Heads and Y Branches.

Here's a letter from one of our pleased customers:

We have about 75 Sleeves and Pot Heads installed in our system, which have been in use for nearly a year. We have not had occasion at any time to repair any Sleeve or Pot Head from any defect caused by apparatus. We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first class in every respect; they are infinitely superior to the old-fashioned wiped sleeve.

(Signed) CEDAR RAPIDS & MARION TELEPHONE CO.,
W. H. DUNN, Sec. & Treas.

We have many other letters just as strong. But why not give us a trial order now? It will be the best proof.

The General Engineering Co., Chicago, Ill., used nearly 400 Novelty devices in equipping the plant of the Lincoln (Neb.) Telephone Co.—not as a matter of sentiment, but of dollars and cents.

Why Not Write Now for That Trial Order?

New Haven
Novelty Machine Co.,
ELM AND STATE STS.,
NEW HAVEN, CONN.

"SPECIAL" Telephone Condensers

The "Special" Condensers are of standard design, and are superior, due to their absolute uniform capacity and ability to stand high voltage without break down.

They are of high insulation resistance.

The "Special" is made to withstand a voltage of 250 volts alternating current indefinitely, without injury or leaking appreciably. The insulation resistance is forty meg-ohms per microfarad, and the greatest variation in capacity will not be over 5 per cent. of the rated capacity.

The "Special" Condenser is neatly and hermetically sealed in metal cases mounted with hard rubber terminals, and tinned brass terminal lugs.

For full information regarding Condensers and about everything else in the telephone line you should have our General Telephone Catalogue No. 19, and Telephone Parts Catalogue No. 21.

Electric Appliance Company,

Telephone Manufacturers.

Electrical Supplies.

92 and 94 W. VAN BUREN ST.,

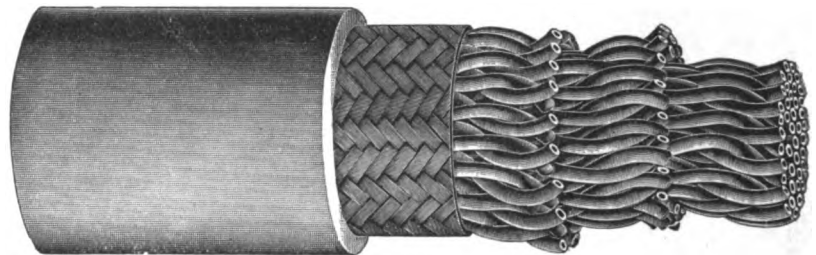
CHICAGO.

WRITE FOR SAMPLE CARD OF WIRES.

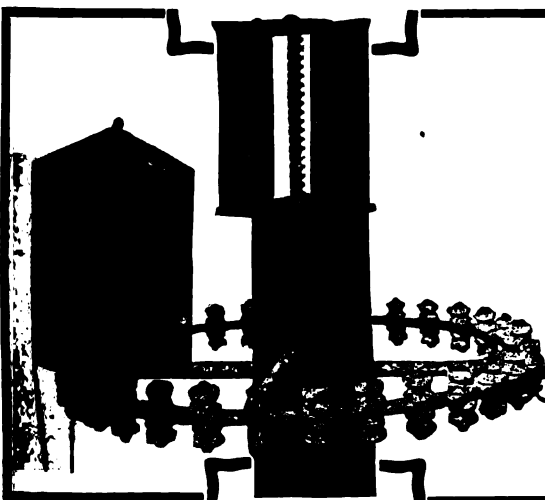
Manufacturers of

"Paranite"

RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::



INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.



THE HALL TYPE D. CABLE TERMINAL WITH DISTRIBUTING RING

Designed especially for *Underground Installations*.
Each pair provided with *Absolute Lightning Protection*, and mounted on *Hard Rubber Only*.

Write for Catalogue.

Mountain State Electrical Company,

Sole Manufacturers,

WHEELING, W. VA.



NEW YORK



CHICAGO.

LONG DISTANCE

Those two words mean success for the exchange equipped to give good *long distance* service, even though it is seldom called upon to make *long distance* connections. In Ohio fully 90% of the independent toll stations are equipped with

STROMBERG-CARLSON TRANSMITTERS

The experienced telephone man knows very well why this is true. Profit by his experience.



ST. LOUIS



DULUTH

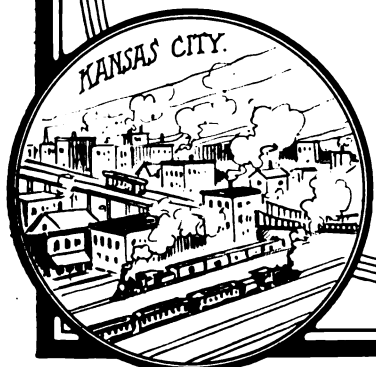
The above transmitter, also a number of our recent improvements in telephone apparatus, described in our new Bulletin, No. 11-B

Mailed free if you mention this Journal

**Stromberg-Carlson
Telephone Mfg. Co.**

Gen'l and Eastern Sales Office
Rochester, N. Y.

Sales Dept.
Chicago, Ill.

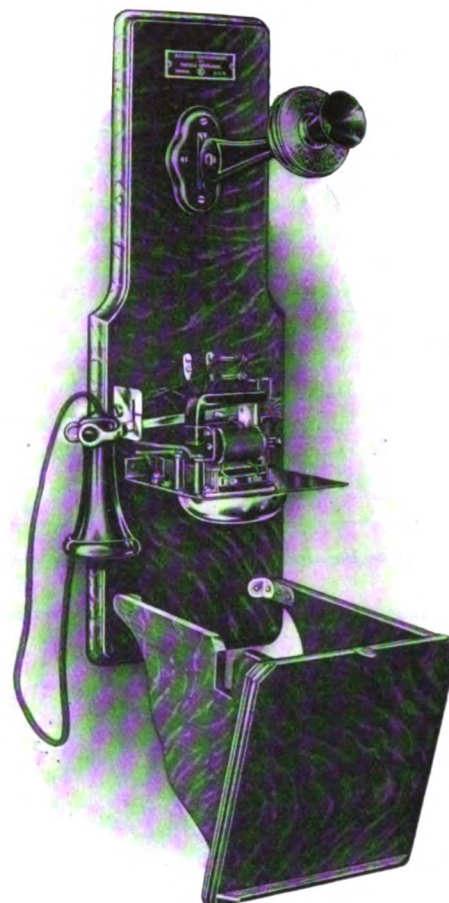
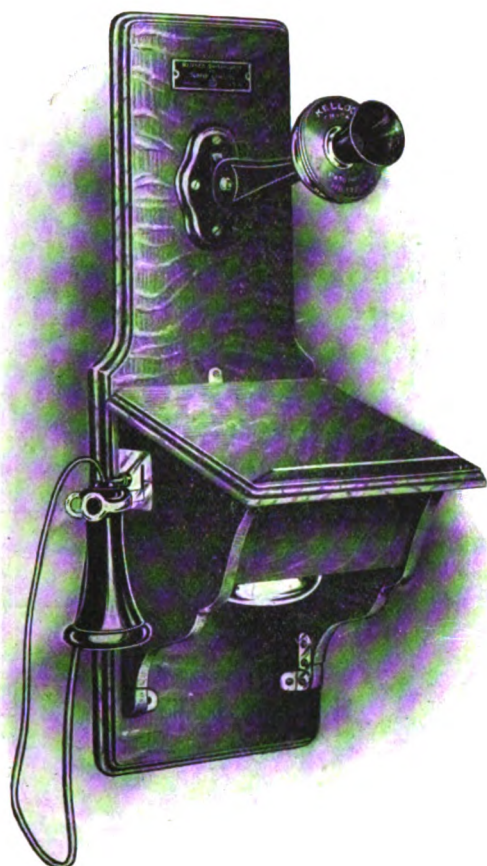


KANSAS CITY.



MINNEAPOLIS

Kellogg Four=Party Line Telephone



A *SELECTIVE Telephone that selects, and absolutely the only system that has ever succeeded in accomplishing this without aid of ground connections.*

This Telephone rings for the desired party alone, and does not ring in any way for any other party on the line.

It Rings with Alternating Current.
It Rings Loud.

It Rings with Distinctive Tone.
It is Used in Our Largest Exchanges.

Kellogg Switchboard & Supply Co.,

GREEN and CONGRESS STS., CHICAGO.

Seymour Building,
LOS ANGELES.

Electric Building,
CLEVELAND.

Keystone Telephone Building,
PHILADELPHIA.

ARROW DRY BATTERIES

Less than 12.....Each 20 Cents
 12 to 49.....Each 18 Cents
 50 to 124.....Each 16 Cents
 Bbl. Lots, 125 to bbl.....Each 15 Cents
 Two-Bbl. Lots and over.....Each 14 Cents

**ONE SAMPLE BATTERY
 FREE TO ANY TELE-
 PHONE COMPANY**

SIGN YOUR NAME HERE:

Name _____

Address _____

Mail this to Us and We will Deliver Battery Free to any Supply Dealer in St. Louis, to be shipped with your first order.

ARROW DRY BATTERY CO.
 ST. LOUIS, U. S. A.



**FOR OPEN CIRCUIT
 SERVICE ONLY**

ARROW DRY BATTERIES

VARNISHED ZINCS

HIGH GRADE IN EVERY PARTICULAR

**THIS BATTERY IS DESIGNED
 FOR OPEN CIRCUIT SERVICE
 OF ANY CHARACTER AND
 IS ESPECIALLY DESIRABLE
 WHERE LONG LIFE IS RE-
 QUIRED.**

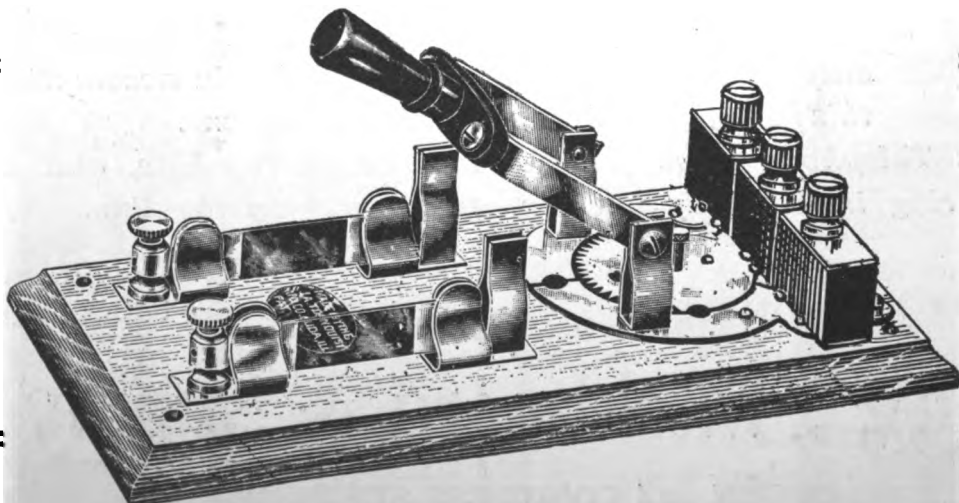
**WITH ORDINARY USAGE THIS
 BATTERY WILL GIVE GOOD
 SERVICE FOR ONE YEAR.**

**ARROW DRY
 BATTERY CO.**
 ST. LOUIS, U. S. A.

KING OF PROTECTORS

*The New "Tornquist" Combination Lightning
 Arrester, Ground Switch, Fuse and Lever Cut-out*

*Wood or
 Porcelain
 Base
 Also Single
 Pole*



*Sample on
 Approval
 Express
 Prepaid*

HART & CO., Inc., Gen. Agts., Monadnock Bldg., Chicago

Reasons

1. *Good material.*
2. *Skilled workmanship.*
3. *Careful inspection.*
- And most important.*
4. *An Honest Endeavor to produce the best.*

In Eastern Telephones
you get all these.

WRITE US

Eastern Telephone Mfg. Co.

WEST CHESTER, PA.

The Exemplification of Unobtrusiveness!

To say this of a man in almost any of the walks of life would hardly stamp him as a success—as we interpret the word in this alert age.

To say it of a woman would convey a very different impression to the minds of most men, for in her the quality is desirable—sometimes.

To say it of

THE PENDENT TELEPHONE

decidedly commends *IT* to men, denoting, as it does, that, besides its unquestioned equality to all high types of the telephone in such features as efficiency, durability, elegance and price, and in addition to its exclusive advantages—consummate mobility, adjustability and adaptability to all distances, angles, places, needs and attitudes, *it interferes with absolutely nothing*, either in use or disuse, though ever almost at one's elbow.

Do you want to try one? It may be returned if not entirely satisfactory.

THE VOUGHT-BERGER COMPANY,

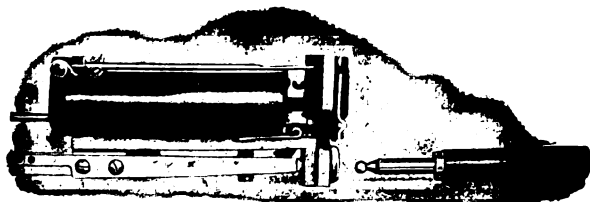
MAKERS OF FIRST-AWARD
TELEPHONES, SWITCHBOARDS AND APPLIANCES,
LA CROSSE, WISCONSIN.

IN THE

“International” SWITCHBOARD

the automatic restoration of the drop is “*Accomplished by means dissimilar to the contact of the plug with the drop as the plug enters the jack.*”

(See the decision)



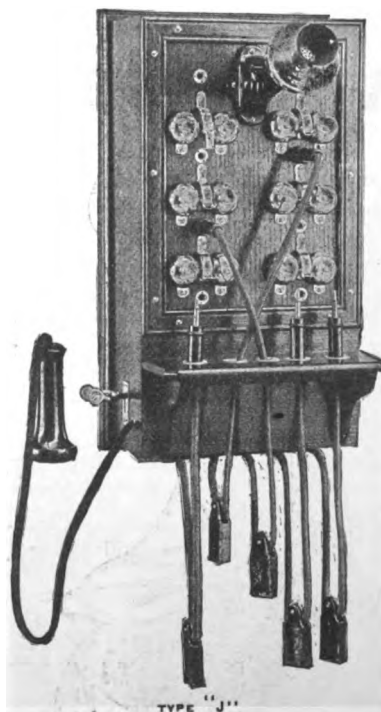
It Don't Infringe

“International” drop fully protected by patents allowed, and
Guaranteed Absolutely Non-Infringing

A SAMPLE

will convince you that it is electrically and mechanically perfect

International Telephone Mfg. Co.
Harrison and Clinton Streets, Chicago, U. S. A.



OUR NEW COUNTRY TOLL LINE SWITCHBOARD

Highest Grade Parts. New Drop Indicator.

VERY LOW PRICE. ANY CAPACITY.

Bulletin with full description on request.

CONN. TELEPHONE & ELEC. CO.
MERIDEN, CONN., U. S. A.

The MONARCH Desk Set



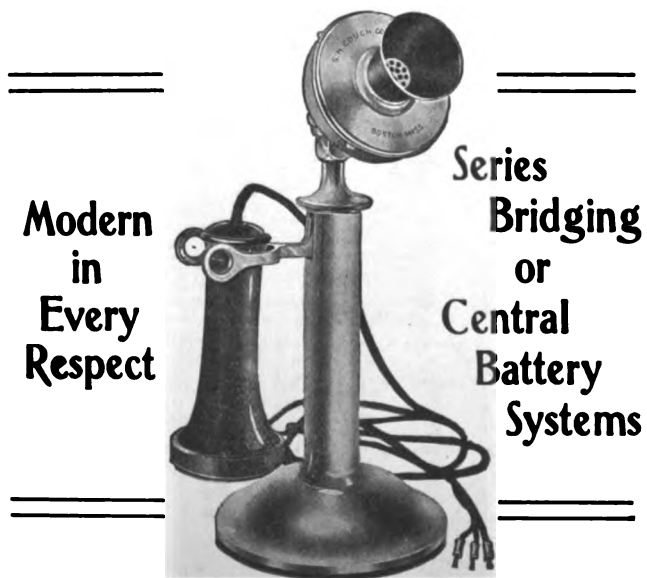
is so simple in construction as to make trouble almost an impossibility. The switch is mounted in the base and is directly actuated by the hook. The arrangement of the springs is exactly the same as in the switch-hook used in Monarch wall telephones. No electrical connections are made with the stand. All connections are brought to a rubber block in the base :: :: :: ::

For full description and prices write

Monarch Telephone Mfg. Co.

10-16 So. Clinton Street, CHICAGO, ILL.

Style No. 66 DESK TELEPHONE



Modern
in
Every
Respect

Series
Bridging
or
Central
Battery
Systems

Bulletin 8 Tells the Story; Send for It.

S. H. Couch Co.,
162 Pearl St., **BOSTON**

NEW TRUNKS

ARE NOT AS GOOD AS
EXPANDED

Metal Lockers

FOR YOUR OPERATORS.

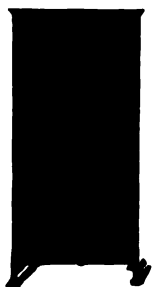
A *Safe and Sanitary* place to leave wraps. Increases the efficiency of your Exchange. In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
MESH MATERIAL CLOSETS**

MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.



WE HELP TO MAKE

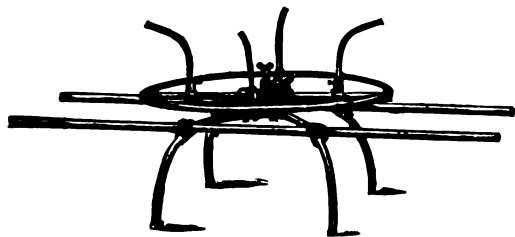
A Good
Telephone



ADDRESS 'BARRARM,' CLEVELAND

"READY" PAY OUT REELS

Pat. June 13, July 27, Oct. 23, 1903.



Before buying construction tools write us for prices and descriptive matter. "Ready" Reels are made in ten styles, all Iron, Cone Bearings, Light and Strong. "Ready" Reels are handled by All Jobbers.

1900 Dry Batteries

The 1900 Dry Battery is an ideal Dry Battery for telephone use. Each Battery is guaranteed by the manufacturer, has long life, High Electromotive force, and large amperage.

A trial order will convince.

The W. G. Nagel Electric Co.

Toledo, O.



ADVERTISERS' DIRECTORY

American Conduit Co.	36	Cameron Appliance Co.	—
American Electric Teleph. Co.	40	Camp, The H. B. Co.	39
Am. School of Correspondence	—	Central Mfg. Co.	—
American Vitrified Conduit Co.	39	Central Telephone & Electric Co.	—
Arrow Dry Battery Co.	6	Century Telephone Const. Co.	11
Automatic Electric Co.	34	Chicago, Burlington & Quincy Ry.	—
Barr, W. J., Mfg. Co.	8	Co.	35
Beidler, Francis & Co.	33	Chicago Insulated Wire Co.	—
Benedict & Burnham Brass & Copper Co.	—	Chicago Writing Machine Co.	—
Bissell Co., The F.	—	Churchill, E.	33
Bruno Bros. & Co.	12	Cohn & Bock	33
Bullard & McElligott	12	Columbia Mfg. Co.	33
Bushnell, A.	33	Connecticut Teleph. & Electric Co.	7
Butterfield, J. F.	34	Cook, Frank B.	—
		Couch, S. H., Co.	8

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Crumb, W. H., Co.	36	Klein, Mathias, & Sons	34
Dickey Clay Mfg. Co., W. S.	36	Lanz, M., & Sons	12
Eastern Telephone Mfg. Co.	7	Lewis Lumber & Mfg. Co.	33
Electric Appliance Co.	3	McIntire, C., Co.	36
Electric Railway Equipment Co.	35	Maltby Lumber Co.	29
Ericsson Telephone Co.	10	Medora Milling Co.	33
Erner Hopkins Co.	34	Merritt & Co.	8
Fahnestock Transmitter Co.	32	Michigan Cedar Co.	33
Farr Tel. & Const. Supply Co.	32	Middleton, I. W., & Co.	33
Fowler, John H.	29	Monarch Telephone Mfg. Co.	8
Gest, G. M.	38	Mountain State Electric Co.	3
Guarantee Telephone & Equipment Co.	—	Mullen, Frank	33
Hart & Co.	6	Munk, Otto	9
Hemingray Glass Co.	37	Nagel, W. G., Electric Co.	9
Hipwell Mfg. Co.	32	National Battery Co.	9
Holtzer-Cabot Electric Co.	32	National Telephone Supply Co.	—
Imperial Finance & Cons Co.	34	National Wire Corporation	35
Indiana Rubber & Insulated Wire Co.	3	New Haven Novelty Machine Co.	2
Index of the Technical Press	30	Nungesser Electric Battery Co.	—
Inland Steel Co.	30	Okonite Company	32
International Telephone Mfg. Co.	30	Pacific Coast Pole Co.	30
Keeling & Ridge Co.	34	Pendleton & Gilkey	33
Kellogg Switchboard & Supply Co.	34	Pignolet, L. M.	31
		Pittsburg Lake Superior Iron Co.	29
		Prosser & Son, L.	33
		Roebeling's, John A., Sons Co.	31

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



STORAGE BATTERIES

UP-TO-
DATE

TELEPHONE BATTERIES MUST HAVE

HIGH CAPACITY

CONSTANT CURRENT FLOW

MINIMUM DEPOSIT IN BOTTOM OF CELLS

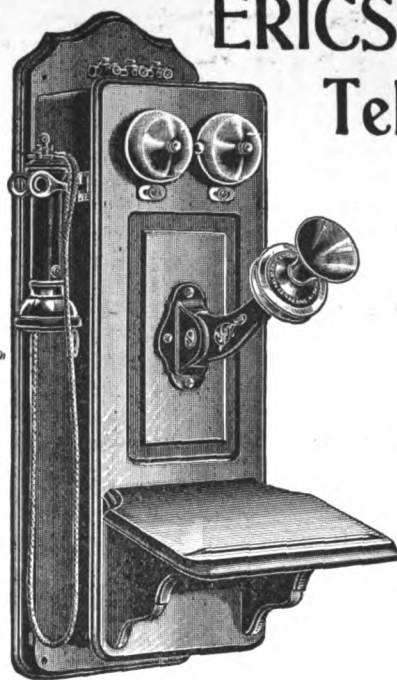
EXTREMELY LOW INTERNAL RESISTANCE

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

GENERAL OFFICES:
253 BROADWAY, NEW YORK.

FACTORY:
BUFFALO, N. Y.



ERICSSON Telephones

For long or short distances, indoor or outdoor use :: ::

They're cheap to maintain and are always in perfect working order, two combinations that make them the cheapest (in the end) and most satisfactory 'phones on the market :: :: ::

WRITE FOR PRICE AND PARTICULARS

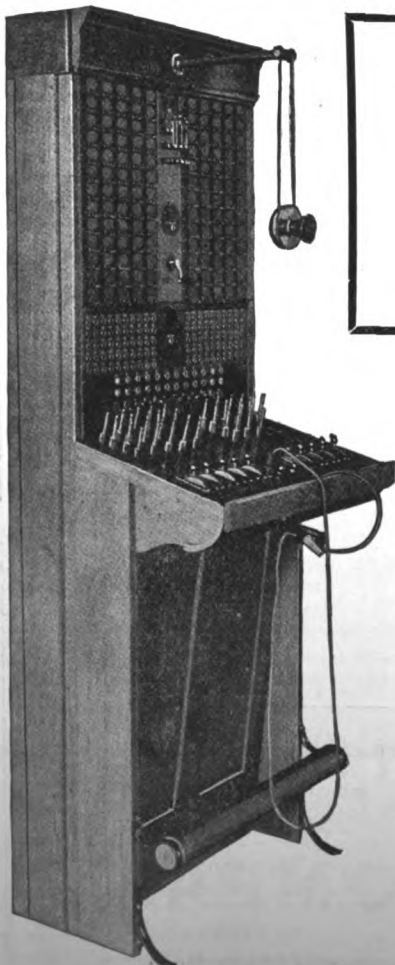
Ericsson Telephone Co.

Manufacturers and Importers of
Switchboards, Telephones and Telephone Supplies

296 BROADWAY, N. Y.

Sand Point Cedar Co.....	30	Bissell Co., The F., Toledo, O.	
Scovill Mfg. Co.....	2	Chicago Insulated Wire Co., Chi-	
Spargo, James A., Wire Co.....	34	cago, Ill.	
Standard Underground Cable Co.....	12	Kellogg Switchboard & Supply	
Standard Vitrified Conduit Co.....	36	Co., Chicago, Ill.	
Stanton, L. W.....	34	Nagel, W. G., Electric Co., To-	
Sterling, W. C., & Son.....	33	ledo, O.	
Sterling Electric Co.....	10	National Wire Corporation, New	
Stromberg-Carlson Telephone Mfg.		Haven, Conn.	
Co.....	4	Okonite Co., New York.	
Swedish-American Tel. Co.....	12	Roebeling's Sons Co., John A.,	
Telephone Printing Co.....	33	Trenton, N. J.	
Valentine Clark Co.....	30	Standard Underground Cable Co.,	
Vought-Berger Co.....	7	Pittsburg, Pa.	
Wanted, Situations, etc.....	400	Stromberg-Carlson Tel. Mfg. Co.,	
Western Electrical Instrument Co.....	34	Chicago, Ill.	
Worcester, C. H., Co.....	29		
Yesbera Mfg. Co.....	—		
ATTORNEYS.		CABLE HANGERS.	
Munk, Otto, New York City.		Bissell Co., The F., Toledo, O.	
BATTERIES.		Bullard & McElligott, Pittsburg,	
Arrow Dry Battery Co., St. Louis,		Pa.	
Mo.		Cook, Frank B., Chicago, Ill.	
Electric Appliance Co., Chicago,		Nagel, W. G., Electric Co., To-	
Ill.		ledo, O.	
National Battery Co., N. Y. City.		National Telephone Supply Co.,	
Mungesser Electric Battery Co.,		Cleveland, O.	
Cleveland, O.		Standard Underground Cable Co.,	
Stromberg-Carlson Tel. Mfg. Co.,		Pittsburg, Pa.	
Chicago, Ill.		CABLE SLEEVES.	
BLANKS, BOOKS AND FORMS.		Nagel, W. G., Electric Co., To-	
Telephone Printing Co., Defiance,		ledo, O.	
Ohio.		New Haven Novelty Machine Co.,	
BONDS.		New Haven, Conn.	
J. W. Middleton & Co., Chicago,		CARD INDEX SYSTEMS.	
Ill.		Telephone Printing Co., Defiance,	
BRASS.		Ohio.	
Benedict & Burnham Brass & Cop-		CLIMBERS.	
per Co., Chicago, Ill.		Klein & Sons, Mathias, Chicago,	
Scovill Mfg. Co., Chicago, Ill.		Ill.	
BOOTH.		Nagel, W. G., Electric Co., To-	
Yesbera Mfg. Co., Toledo, O.		ledo, O.	
CABLE CLIP.		CONDUITS.	
Bullard & McElligott, Pittsburgh,		American Conduit Co., Chicago,	
Pa.		Ill.	
National Tel. Supply Co., Cleve-		American Vitrified Conduit Co.,	
land, O.		New York.	
CABLES.		Camp Co., The H. B., New York.	
American Electric Tel. Co., Chi-		Gest, G. M., Cincinnati, O.	
cago, Ill.		Nagel, W. G., Electric Co., To-	
		ledo, O.	
		Standard Vitrified Conduit Co.,	
		New York.	
		W. S. Dickey Clay Mfg. Co.,	
		Kansas City, Mo.	

CONTINUED ON PAGE 31.

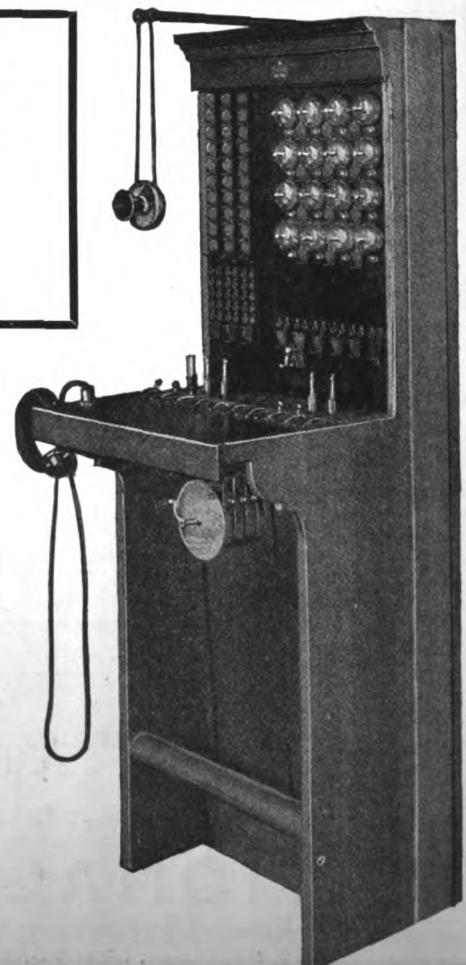


SWITCHBOARDS TELEPHONES PROTECTORS

If You Don't See
What You Want,
Ask For It

WE MAKE 'IT

Sterling Electric Co.
LAFAYETTE, IND.



Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Century Common Battery Switchboards

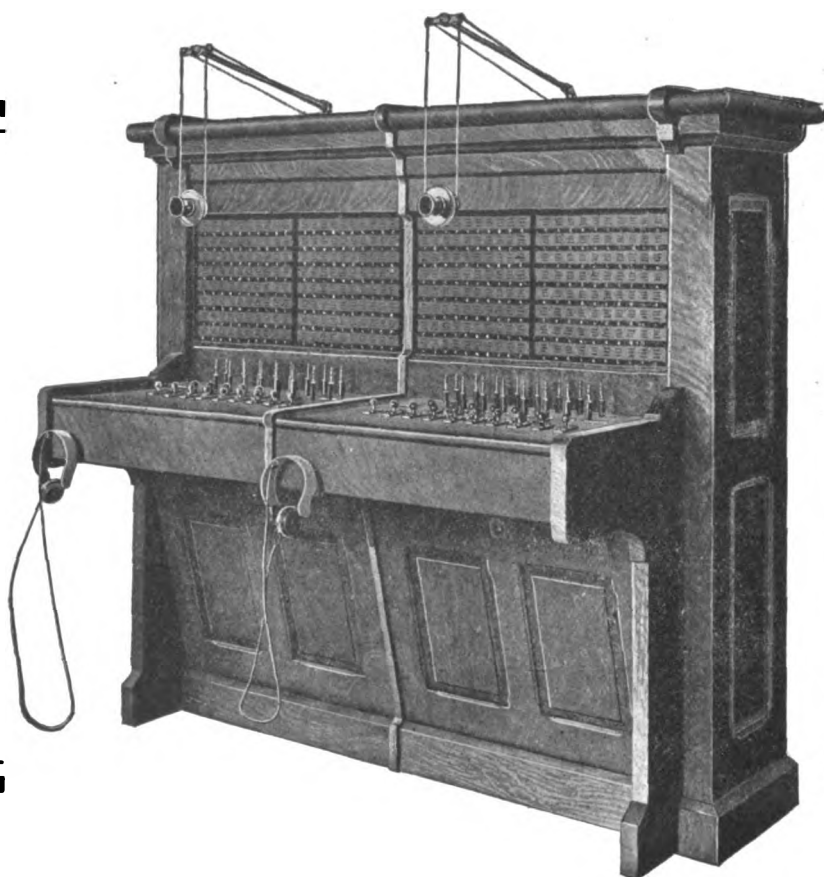
LAMP OR VISUAL SIGNALS MULTIPLE AND TRANSFER TYPES

*Simple in
Construction*

*Rapid in
Operation*

*Low Cost of
Maintenance*

*Elegant in
Appearance*



*Built in
Capacities
of 50 to
10,000
Lines*

*100 to 160
Lines per
position*

*Write for
Catalogue
and Prices*

We Manufacture a complete line of Telephones and Switchboards for Common Battery and Magneto Systems.

We will have an Exhibit in Rooms 116-118 Genesee Hotel, Buffalo, N. Y., during the N. Y. State Independent Tel. Association Convention, June 23-24, and will be pleased to meet all members and visitors there

Century Telephone Construction Company

General Offices and Salesrooms: 528-540 Ellicott Sq.

Factory and Warehouse: 481-489 Washington St. - - - Buffalo, N. Y.

In the Life of a Telephone Lies the **PROFIT THEREOF**

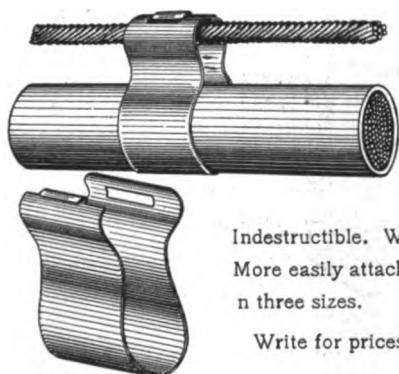
How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO



The Pittsburgh Cable Clip

Indestructible. Will not slip on or cut cable.
More easily attached than any other. Made
in three sizes.

Write for prices and particulars.

BULLARD & McELLIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.



M. LANZ & SONS, PITTSBURGH, PA.

**PLAIN
AND
GALVANIZED**

Manufacturers
of

**Telephone and
Telegraph Line Material**

Prevent Breaking Down of your Lines

During and after Rain and Snow Storms

by a judicious and timely use of **S. P. F. Carbolineum** on poles, crossarms and pins. 25 years' record.

BRUNO GROSCHÉ & CO.,
27 William St., New York.

**Telephone
Wire**



**and
Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insu-
lated Wire and Cables

Aerial—Underground—Submarine
Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. SAN FRANCISCO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JUNE 18, 1904

NUMBER 25

A TELEPHONE NEWS BUREAU

BY ANTONIO WEST.

IN the city of Buda-Pest, Hungary, a system of distributing news by telephone has been in operation for several years.

An entirely separate and distinct telephone system from the regular exchange is employed. Separate circuits are run to the substation, which consist of a receiver and bell, and at the main office a corps of male operators are equipped with powerful transmitting instruments. At certain specified times of the day the subscribers are signalled and the news read off to them. For instance, in the morning the reports would consist of foreign news, stock market quotations, police intelligence, etc. Around noon-time racing news is given; during the afternoon the events of the day are recorded, and at night the circuits are connected with some musical attraction, so that the patrons can sit at home and listen to an opera, or the latest popular song. In England special circuits have been equipped with powerful apparatus, so that a speech of general interest occurring in one town was being listened to by a large audience in a city many miles away.

There may be other instances of news dissemination with the aid of the telephone; but it has remained for the *Evening Telegraph*, of Philadelphia, in conjunction with the Keystone Telephone Company, to give an information service which is thorough and at the same time requires no special apparatus, other than a branch exchange. On April 15th, the Philadelphia *Evening Telegraph* inaugurated its free information bureau and placed within the reach of 15,000 local subscribers of the Keystone Telephone Company a news service of greater magnitude and wider scope than had ever before been attempted. Since then "Main 1800" has become the most familiar telephone call in the city, and the success of this unique enterprise has been far in excess of the estimate made by its most optimistic promulgators. Information upon almost every known subject is called for by the general public, and in every instance where a reply can be found it is given to the calling party within a few moments of the question being received.

The practical value of the Information Bureau is demonstrated by the hundreds of questions asked daily by professional men, lawyers, doctors, manufacturers, clergymen, inventors, investors, travelers, etc. Queries relating to market quotations, court decisions, steamer and railway schedules, routes, and rates of fare, location of fires, or the latest baseball returns are received con-

tinuously. When a busy housewife is in doubt as to the correct method of cooking a dish; if she has a Keystone telephone, her first thought is to call up "Main 1800," and she doesn't have to wait long for the desired information. If an outing or excursion is being planned, the *Evening Telegraph* will give you all the information about different resorts, together with the cost of fares, and the time it takes to go. Should you have a knotty problem or a puzzle to unravel, it's ten chances to one that the operator at "Main 1800" can help you out of your difficulty.

An instance of the Information bureau's rapid distribution of news was the dissemination of the announcement of Senator Quay's death on May 28th. In this case "Main 1800" did not wait to be asked. No sooner had the electric current sped the laconic message from Beaver, Pa., "Senator Quay died at 2.48 P. M.," than the force of alert telephone operators repeated it times without number throughout Philadelphia, Camden, and towns

within a radius of thirty miles. The news was sent simultaneously to the Mayor and directors of the different departments at the City Hall, to bureau chiefs, political headquarters and all the clubs and hotels.

In every instance the exclamation of regret was sufficient proof that "Main 1800" had been the first to convey the fact. At Franklin Field, where thousands were watching the intercol-

legiate games, and at both ball parks, the assembled crowds heard of the sad event as soon as it was known through the *Evening Telegraph's* reporters. There is only one class of information that this bureau does not furnish, that is, betting odds, starters and names of jockeys in horse racing.

The policy of the *Evening Telegraph's* Information Bureau is "If it's worth your while to ask a question, the answer will be cheerfully given." The entire plant of the *Telegraph* is at the service of the bureau, and no trouble or expense is spared to give correct answers to all questions. An employment department is one of the features of the bureau. Anyone in search of work can call "Main 1800" and ask for it. If the want can be filled from the applications on file the desired information is given; if not, the application is published in the paper. All this is done without charge, except where calls are made from pay stations or over toll lines, when the usual charge is made; local pay station calls being only five cents.

The switchboard for the bureau was installed under the direc-



The Telephone Information Bureau of the Evening Telegraph, Philadelphia, Pa.

tion of Mr. John W. Kelley, superintendent of the Keystone Telephone Company. It consists of a horizontal central energy board and is equipped with twenty incoming trunks and one outgoing trunk. The instrument equipment consists of seven portable desk sets and four breast plate transmitter sets; all having head band receivers. The board is so arranged that it can be operated with one or twenty operators, as needed, by means of switching keys. A party calling "Main 1800" is connected with a trunk that is not busy bringing up the lamp signal. One of the operators takes up the call and receives the query. When possible, the answer is given at once, but if it is necessary to look up the answer, a shunt key is thrown into circuit holding the signals at the telephone office.

Our illustration of the bureau will give an idea of the switchboard and also of the extensive information library which is necessary to give replies to the thousand and one queries that are asked. The average number of questions received and answered in one day is over 2,500, and on special occasions the number has been nearly 4,000. The hours for business are from 8 A. M. to 12 P. M., and later if events of great public interest demand it.

Incidentally, this bureau furnishes another instance of the superiority of the Independent methods over those of the Bell. The Bell company of Philadelphia has inaugurated a similar bureau

Call
The
Evening Telegraph
Main 18-00
for
Information

The Best Known Call in Philadelphia.

in conjunction with a morning newspaper. Since it has but a very few unlimited circuits, the majority being confined in number of calls to from 300 to 1,000, according to the rates paid, every call costs, and consequently the scope of the bureau is limited to those calls which are considered of an importance to warrant the expense. Besides the rates are much higher than those of the Keystone for unlimited service, and the majority of circuits being party lines, it is evident that the availability of the lines to individual subscribers is restricted when an event of importance has taken place.

It was for the purpose of giving the citizens of Philadelphia the very best telephone news service available that the *Evening Telegraph* decided to install the Keystone telephones after a thorough investigation of the value and availability of the different systems. That its decision was a wise one is evidenced by the fact that from all quarters come words of praise and compliment in acknowledgment of this most up-to-date method of distributing news and serving the public with the most thorough and accurate knowledge upon any subject that under ordinary circumstances the questioner would find difficult, if not impossible, to secure. A few words in closing: The illustration of the Information Bureau's call number is taken from a card that has been furnished to all Keystone telephone subscribers.

SOME REMARKS ON INSTRUMENT SETTING, CABLE BOXES AND DISTRIBUTING HOODS

By B. C. WILHELM.

IN many cases where underground construction is made use of, the distribution is of the overhead nature, and the work done in building the drop line is similar to that already described. There are three ways in which underground cables are terminated aerially. First, they are run into a cable box

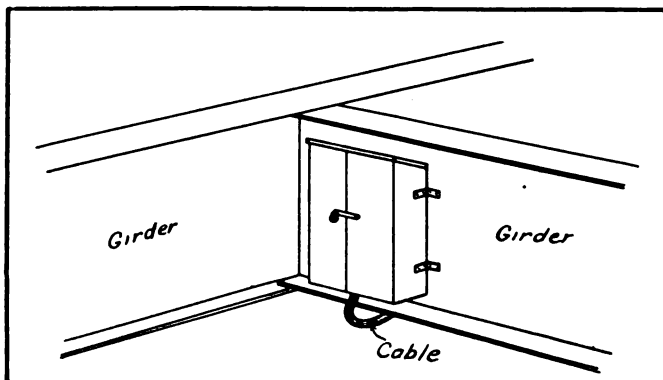


Fig. 3.

placed upon a pole. Second, they are run to the top of a distributing pole. Third, they are run to a box placed on the elevated railroad structure, in cities that are so equipped.

The method of equipping a terminal box at which a cable is entered differs from that used in terminating an open wire line, wherever the drop wire is carried for a distance of 300 feet and for shorter runs, when there is liability of the drop wire being crossed with foreign circuits. In order that the cable may be protected against the possible entrance of high voltage, each

conductor of the cable is passed through a 7-ampere fuse. These fuses are arranged in strips and mounted inside of the cable box. Such an arrangement is shown in Fig. 1, where the box is shown exposed, at *a*, the underground cable entering at *b* and its conductors connected to the fuses, *1*, *2*, mounted on the strips *e* and *f*; *c* is a strip with holes bored through, through which the wires are taken to remove the strain from the point of connection to the binding posts. The drop wires are connected to

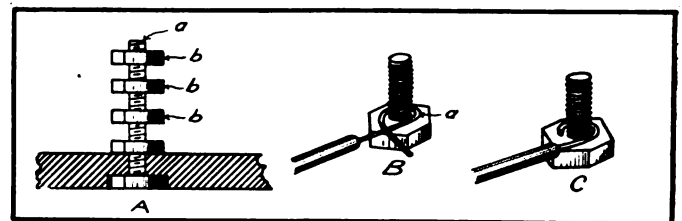


Fig. 4.

binding posts on the strips *d* and taken out at the holes *g*, *g*. The cross connecting wire is shown at *F*.

In Fig. 2 is shown the most approved form of distributing hood, which is constructed of sufficient size to accommodate the protecting fuses. It consists of a base plate, *a*, mounted on a wrought iron ring, with four arms. These four arms terminate in a larger iron ring *d*, which has four supports, two of which are shown. Upon the base plate, *a*, is mounted the arresters, and a hole is cut in the bottom to allow of the passage of the pot head cable. The arresters are protected from the weather by a sheet iron cylinder, topped with a hood, *f*. The door, *g*, gives access to the interior. The drop wires are brought out and are fastened

to the porcelain insulators as at *c*, to take the strain off the binding posts.

The boxes used on elevated railroad structures are the same as those used on poles, and are usually fastened to the side of the transverse girders, at the angle formed by the longitudinal girders, as shown in Fig. 3. The underground cables reach the box by being carried up the columns, in protecting iron pipes. It is customary to suspend aerial lead cables from the girders of elevated railroads, and when such practice is resorted to these

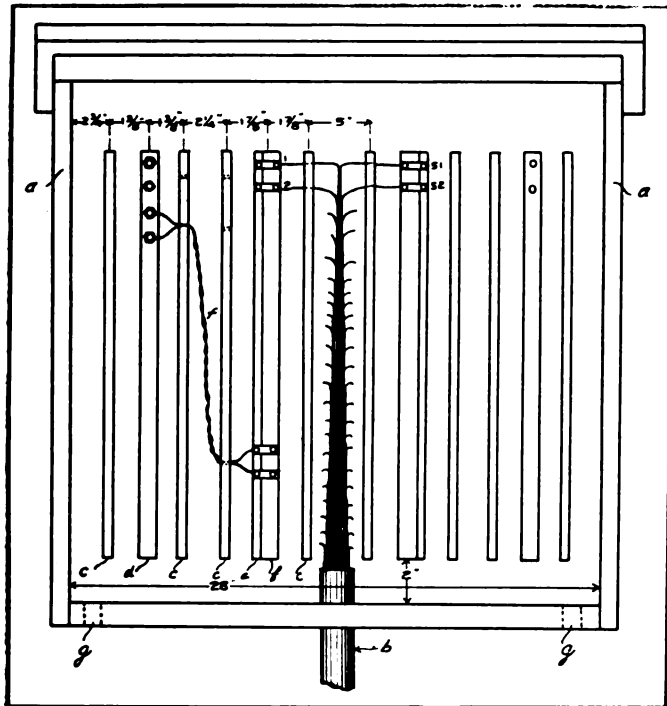


Fig. 1.

cables are entered into the boxes in the usual manner. These are always equipped with 7-ampere fuses placed in the box. In passing it might be remarked that all aerial cables are equipped in this manner.

In Fig. 4 is shown a detail of the binding post used to attach the drop wire. It will be seen that the post, *A*, is equipped with three nuts, *b*, *b* and *b*. The drop wire is placed between the lower nuts, while the cross connecting wire is held between the upper ones. In fastening the wire to the binding post care must be taken not to allow the free end to overlap, as shown at *a* in Fig. B; for when this condition exists, tightening the upper

nut will bring all the pressure at this point, and the surface of contact between the wire and nuts will be restricted to this point, and will therefore be very imperfect. When, however, the wire is laid upon the lower nut in the manner shown in Fig. C, the bearing surface between the wire and the two nuts will be ex-

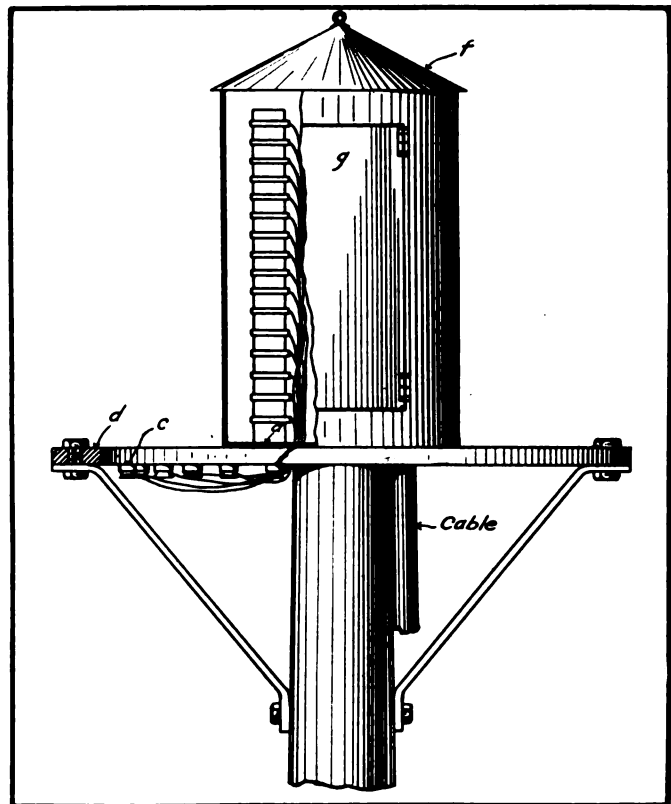


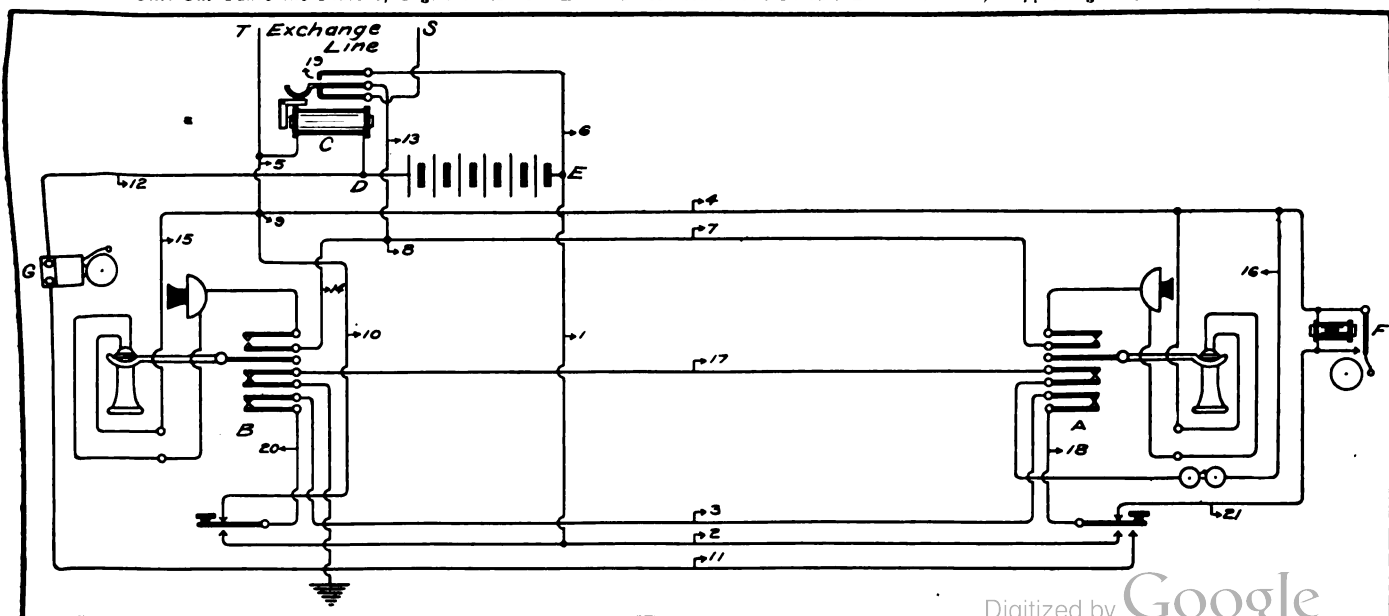
Fig. 2.

tended throughout the length of the circle, and the contact will be better.

Again, with the condition shown in Fig. 4, the bearing surface being small, the wire is liable to become flattened at *a*, and when this happens the upper nut will become loosened, with the result that the wire will no longer be firmly held. This latter is a very bad condition and results in what are known as "cut-outs."

The particular point to be observed in building the drop line from a distributing hood is that the wire must be securely held by the porcelain insulator placed on the under side of the outside ring. The strain is thus taken off the binding post.

This Cut Takes the Place of Fig. 1 in Article Entitled "An Automatic Private Line Extension," Appearing in Our Last Issue.

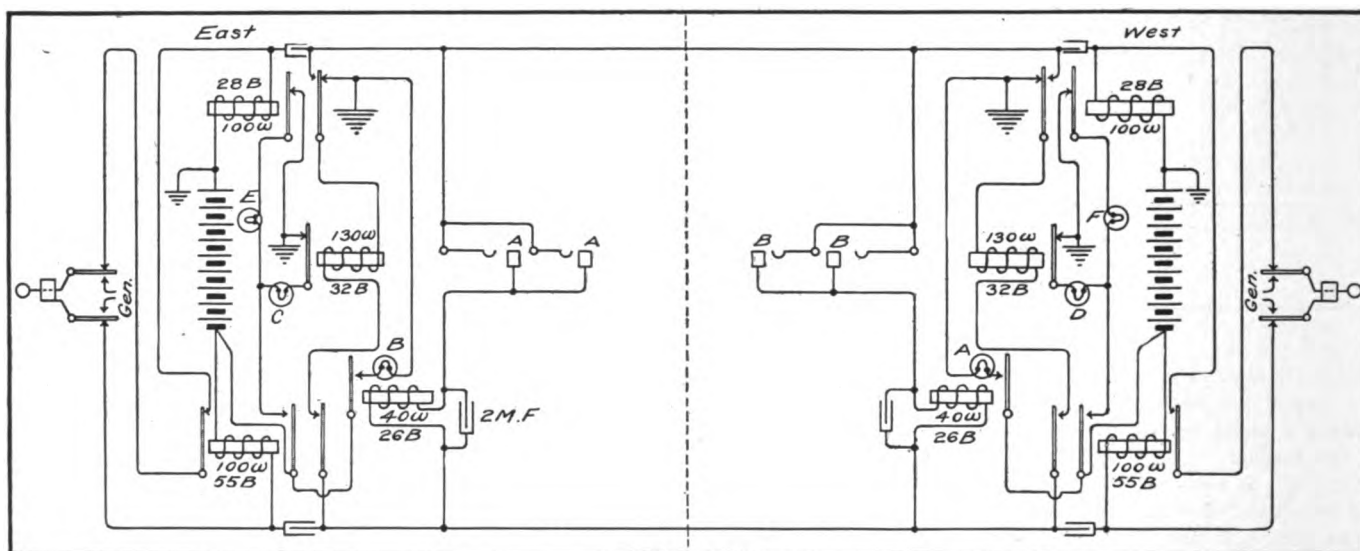


A TWO-WAY TRUNK CIRCUIT

By JAMES R. GEMMILL.

THE two-way trunk circuit herewith described is suggested to operate in a common battery system, where the sleeves of the subscribers jacks are permanently grounded through the winding of the cut-off relays, these relays having a high resistance. By referring to the diagram the various pieces of apparatus will be noted and also the scheme of operation. For ease in describing the circuits the two ends of the trunk are timed *East* and *West*. Since the equipment at each end is the same an analysis of the apparatus at East will serve for West as well. The trunk, it will be noticed, terminates at jacks as well as with a cord and plug. The jacks, *a a*, are mounted in the regular outgoing trunk multiple, while the cord and plug are placed at the incoming trunk position. The three lamps, *E C* and *B*, are mounted with the cord and plug at the incoming trunk position. Their functions are as follows: *E* is the subscribers' signal, and is controlled by the relay, *28B*. *C* is the operators' signal to indicate when the originating operator has connected the trunk with the calling subscriber; and *B* is a

through the winding of the *28b* relay to the ground. This energizes the *28b* relay and opens its two contacts, putting out the subscriber's signal lamp, *E*, and transferring the grounded connection of the *32b* relay at East to the tip side of the trunk over which it gets battery through the tip side of the subscriber's cord at West, which causes the armature of the *32b* relay to be held back and so keep open the circuit of the operator's signal lamp, *C*. Now, when the subscriber at East hangs up, the *28b* relay circuit being opened, its contacts fall back, giving the subscriber's disconnection signal at the *E* lamp. When the calling party at West hangs up, and the operator at that end disconnects, the battery circuit at the sleeve of the jack, *B*, being opened, the *55b* relay at East releases its armature and opens all contacts and restores the trunk to its normal position. The reverse operation takes place when the calling party is at East and the called party at West. The condensers bridging the *26b* relays at both ends are placed there to shunt out the retardation of those relays. The condensers placed between the



Circuits of Two Way Trunk

supervisory lamp which, when lighted, indicates that the trunk is in use at the outgoing trunk multiple, *A A*. The operation is as follows:

Let us suppose that a party at the West Exchange is calling a party at East. The operator at West goes in on her circuit button and asks East to assign a trunk. As soon as the trunk operator at East has put the plug in the jack a circuit is formed from the battery through the *55B* relay, the sleeve of the plug, the sleeve of the jack and through the cut-off relay to ground and back to the battery, energizing the relay *55B*, and closing its three contacts. At the same time the calling operator puts a cord up in the jack, *B*. The subscribers' cords, it should be stated, have battery on the sleeve and ground on the tip. A circuit is now formed from the battery on the sleeve of the subscriber's cord at West, through the sleeve of the jack, *B*, relay *26b*, sleeve side of line, middle contact of *55b* relay at East, through winding of *32b* relay to ground at East. The *26b* relay at West, being energized, closes the circuit of the supervisory lamp, *A*, indicating to the West outgoing trunk operator that the trunk is being used in the reverse direction. The *32b* relay at East, being energized, opens the ground of the operator's signal lamp, *C*, indicating to her that the operator at West has put up the correct trunk. As soon as the party called at East answers a circuit is formed as follows: From the battery through the winding of the *55b* relay to the sleeve of the trunk out over the subscriber's line, back through the contact of the *55b* relay and

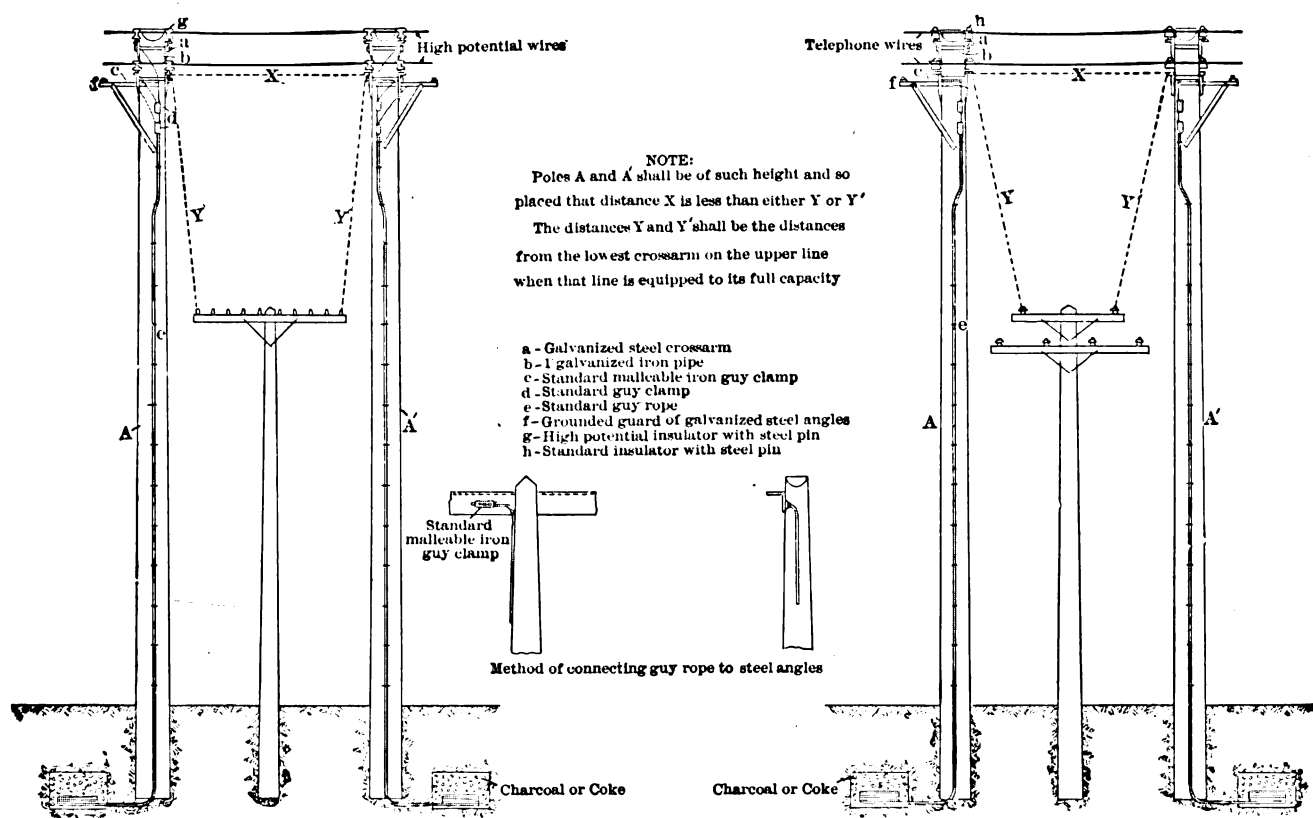
relay circuits, *28b*, and the tip side of the trunk, and also between the *55b* relays and the sleeve side of the trunk, are to separate the different circuits so they may operate independently of each other. The question may arise, "What advantage does a circuit of this description have over the regular incoming and outgoing trunk circuits?" The best practice of modern telephone engineering is to so distribute the trunking facilities that a maximum efficiency is attained. Now in offices where the number of messages requiring trunk service does not maintain a working efficiency of 50 per cent. of a period of time, which we will state as being twenty-four hours, then the cost of the trunks in maintenance and construction is out of proportion to their earning capacity. For instance: Two circuits between different exchanges are worth at least \$60 a year each. The equipment for each pair is practically double that required for a two-way trunk. The approximate cost for equipping a trunk as described here is in the neighborhood of from \$25 to \$30. A little calculation will show that under the conditions named there is a saving in the neighborhood of \$50 to \$60 a year, and, at the same time, the working efficiency of the trunk is at the maximum point. It is very evident that a two-way trunk, in exchanges of moderate size, is thoroughly practical from every standpoint, and, at the same time, the additional circuit necessary for the regular operation of incoming and outgoing trunks can be used for some other purpose and bring in returns commensurate with its value.

PRECAUTIONS TO BE OBSERVED IN THE CONSTRUCTION OF INTERSECTING AERIAL LINES

By C. A. SCOTT.

WITH the rapid extension of underground systems and the adoption of aerial cable for overhead lines, very much of the danger which formerly existed in open wire lines, due to the probability of crosses between broken wires, has been obviated. Nevertheless, electric power transmission has, in the past, rapidly grown and is now even more rapidly extending, and, consequently, the exposure of telephone and telegraph lines to injury from cross with wires carrying high potential currents of magnitude, has correspondingly augmented. It may be said that electric lighting and power plants never use cable upon aerial lines, but universally employ open wires. Of necessity such lines must often intersect or run parallel either above or below or on the other side of the street from a telephone or telegraph line, and it becomes a problem of great importance to so arrange the vari-

consent to allow both sides to be used. It is also often desirable that but one set of poles should be used. The telephone companies have formerly taken the position that it was impractical to run two sets of wire on one set of poles; that if this were done natural leakage from the high-potential wires would be sufficient to render the telephone lines too noisy to be operative, and that the danger to which employees would be subjected by requiring them to crawl through the wires charged with a death-dealing voltage would be an inhuman exposure. Practice, however, has shown such assertions to be unfounded. There are many instances where electric light, telephone and telegraph circuits are carried upon the same line of poles for miles without unreasonable interference. And it is true that linemen constantly climb among high-potential wires without experiencing the slightest injury.



Figs. 1 and 2. Construction of Short Spans at Crossings With High Potential Wires.

ous circuits that in the event of a broken wire, which sooner or later must occur on one line or the other, that the least possible damage will accrue. It often happens that a telephone or telegraph line, or both, may desire right of way where the street is already occupied by an electric lighting circuit, or, conversely, the lighting circuit may wish to string its wires along the same route as is already occupied by the line of a signal company. Usually a quarrel results and appeal to the courts is necessary to settle the question. It cannot for a moment be denied that it is desirable to keep telephone and telegraph lines as far from electric power lines as is practical, but it is equally true that in many cases it is physically impossible. Sometimes there are two telephone companies, two or more electric light companies, and two telegraph companies. As a street has but two sides it is physically impractical to keep all separate. In many cases esthetic considerations lead property owners to desire that but one side of the street shall be occupied with unsightly pole lines and to refuse

Nevertheless, the undesirability of joint pole lines, or the intersection of two wires of widely different character, must be fully recognized, and such designs employed in the construction of lines of this description as to minimize danger and so arrange the circuits that there may be the least possible interference. As the number of wires carried by an electric light or power circuit is usually much less than that required for a telephone or telegraph line, and as such wires are always of larger diameter, and consequently stronger, it is desirable that the power wires should be carried over the telephone or telegraph line. Also this method secures much greater safety to the linemen. A workman desiring to repair the low-potential line is not exposed to contact with the high-potential wires, because to reach the low-potential circuits he does not need to come in contact with the high-potential wires. Contrarywise, a lineman wishing to work upon high-potential wires can climb through the low-potential lines with impunity, because such wires are never charged with dangerous voltage.

As in recent years there has been a very rapid increase in

both telephone, telegraph and high potential wires, a number of designs have been worked out showing what experience has indicated to be the best method of mutual protection. Wherever it is possible, the high potential lines should be carried over the low potential wires and carefully anchored. Figs. 1 and 2 are good examples to be followed in the construction of short span

pole is supplied with an iron guard, *F*. This is made of a piece of galvanized angle, which is bolted to the pole directly beneath the high tension wires and connected with the ground rope. The object of this guard is to catch a falling wire and ground it before it can become crossed with the high tension wire. The guard projects from the wire about 18 inches, and thus is ample

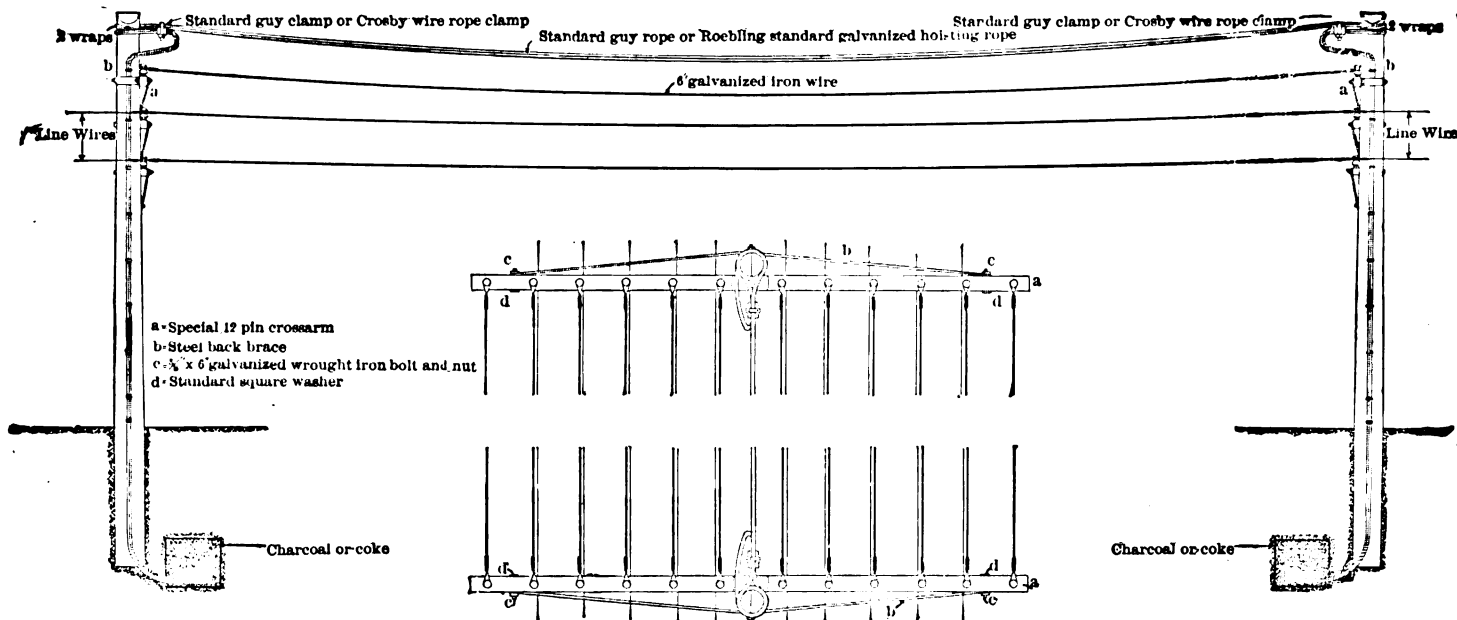


Fig. 3. Protection for Telephone Wires Crossing Under High Potential Wires.

overhead crossings. Fig. 1 is a view showing the short span as constructed in the high tension line, while in Fig. 2 a telephone span is shown. In the method shown in Fig. 1 the crossarms are of galvanized steel angles that are carefully grounded by means of a galvanized wire rope some $\frac{3}{8}$ to $\frac{5}{8}$ of an inch in

for the purpose. To provide a suitable ground for the ground ropes a hole is excavated at the base of each pole of sufficient depth to reach a permanently moist stratum of earth. In this hole two or three bushels of coke or charcoal are placed, into which the ground rope is placed and thoroughly buried. In

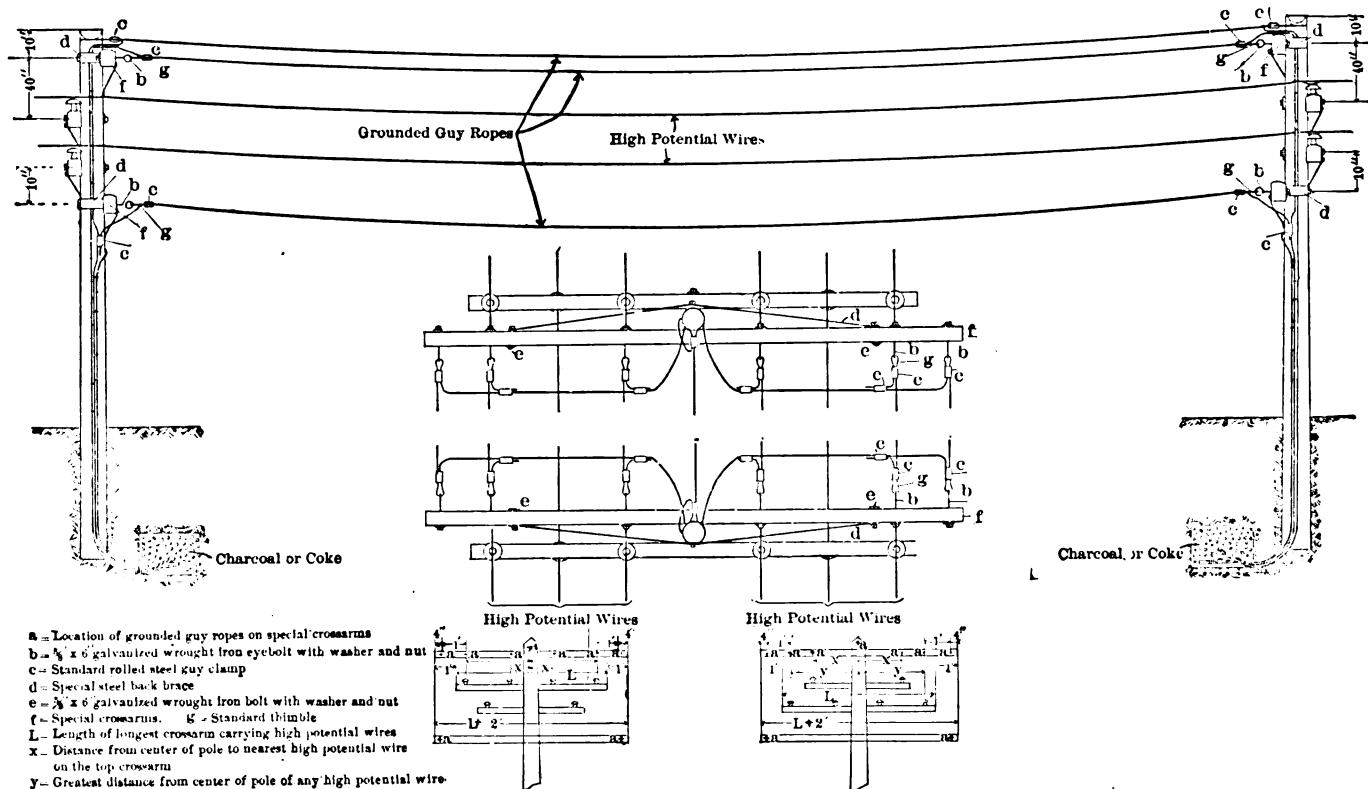


Fig. 4. Protection for Telephone Wires Crossing Over High Potential Lines.

diameter, thus providing ample carrying capacity, so that in case a cross occurs between the arm of a high tension wire, ample ground is at once provided. To provide sufficient strength, insulated pins are usually of galvanized iron. In addition, each

order to secure adequate contact between the rope and the coke it is advisable to twist the rope into a zig zag and bury it thoroughly.

Formerly the practice of coiling a ground wire into a series

of turns had been advocated. This, however, is objectionable, as the coil presents considerable impedance, particularly in the case of a lightning stroke, so that it is preferable to make a zig zag which should be thoroughly buried and contracted among the coke. The short span forms the most desirable crossing and should, if possible, be constructed in the high potential line. To this end the spacing of the pins in the telephone line may be, at this point, reduced, so that a six-foot crossarm can be used in place of the standard ten-foot one. But if it be found impractical to arrange the power wires crossed overhead, it is feasible with the same precautions to arrange the low tension wires above the others. Of course, many cases arise due to the topographical features of the country, where it is impractical to use the high span crossing. Then the best method is to have the high tension line cross the low tension one and to protect the low tension wire, as shown in Fig. 3. This consists in placing between the poles of the high and low tension line, as close to the tops of the latter poles as practical, a grounded iron or steel rope of such size as will safely carry at least three or four times the normal current of the power wires, and to place below this grounded rope a metallic screen built of twelve No. 6 B. W. G. galvanized iron wire. Then the low tension lines are

laid upon care in securing, in the method, as has been already specified, the best possible ground connection. Figs. 4 and 5 illustrate the method which it is desirable to adopt when neither the short span crossing can be arranged, and when it is impractical to carry the high tension ones. The method shown in Fig. 4 involves the erecting, on the power line, of a ground rope so situated that if a low tension wire breaks and falls it will be in contact with the ground rope as well as the high potential wire. Under such circumstances the telephone wire is grounded after its contact with the high tension wire and consequently there is little probability that the dangerous current will be conveyed thereby either to the central office or the subscriber's substation.

The general design and location of the ground ropes should be that shown in Fig. 4 with all constructed details mechanically strong. Fig. 5 gives a method that may be used when the protection must be located upon the telephone or telegraph line. This consists of a grounded net similar to that already described, situated directly below the telephone wires and so arranged that a falling wire will be caught by the net and grounded before it comes in contact with the high potential wire. The various designs of protection here illustrated are the outcome

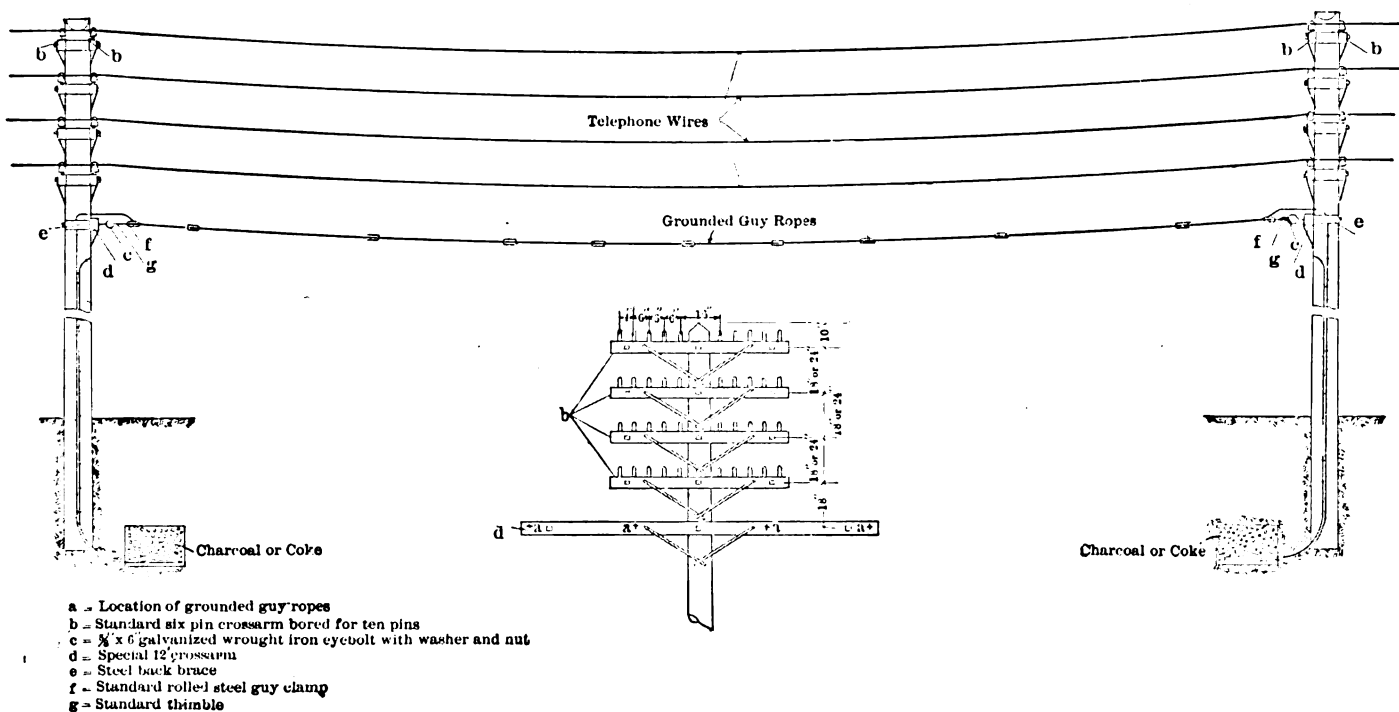


Fig. 5. Side View of Protection for Telephone Lines Crossing Over High Potential Wires.

carried as usual upon the crossarms placed underneath the screen.

The philosophy of this method of protection is as follows: In case a power wire breaks, or sags, it is probable that the ground wire will be directly in its path. When the high pressure wire touches the ground wire so much current will flow that it is probable that the circuit breakers at the power station will be operated and the line opened. Even if this should fail the demand of current will be so great as to practically lower the voltage of the power wire sufficiently so that in the event of further contact with telephone lines little or no damage will be done. Also so much current will flow that it is likely that the power wire will be fused and burned off at such a height as to be incapable of touching the low tension line. Such fusing usually occurs between the formation of an arc between the fallen wire and rope. The screen of No. 6, B. W. G. wire, extending a foot on each side of the low tension lines, serves as an additional protection to catch a falling wire and ground it in connection with the ground rope.

The value of all the protection thus described depends upon the perfection of the ground, and too much stress cannot be

of considerable experience in protection of this kind and are described by Mr. R. A. Chetwood, in a recent number of the *Electrical World*, to whose courtesy we are indebted for the cuts accompanying these paragraphs.

The location of aerial lines is so varied that a multitude of designs would be required in order to fit the topography that is frequently encountered, so that the designs here presented must not be regarded as final or conclusive, but only as indicating the general method whereby protection is secured, and having grasped the principle, any ingenious lineman will, from time to time, make such modifications and improvements as the particular instances brought to his notice suggest. The broad generalization taught by the plan described is that of providing a thorough ground so located that a falling wire, whether from a high or low potential circuit, shall be caught and dead grounded before it can come into contact with the system to which it does not belong, and whether this is accompanied by a metallic cross arm, a ground rope or a wire net, or other device, makes little difference. The essentials are a thoroughly good ground and a device which shall be successful in catching the misplaced wire.



AN INDEPENDENT OBJECT LESSON.

A COMPARATIVE statement which has recently been issued, showing the rates of the Bell and Cuyahoga telephone companies for service at Cleveland, Ohio, recalls the direful predictions made two years ago, regarding the future of Independent telephony in Ohio.

The failure of what was known as the Everett-Moore syndicate in 1902 was a great shock to the telephone world and was hailed with glee in certain quarters. This syndicate controlled the long-distance lines in the State of Ohio, and Cleveland was in the center of operations. When the failure came the Bell press and the newspapers which drew their inspiration from Bell sources sounded the death knell of Independent telephony in the States.

According to them, the disintegration of this syndicate was the beginning of the end of the Independent experiment, and demonstrated, among other things, the greatness and glory of the Bell monopoly and that, outside of Bell securities, investment in telephone properties was a delusion and a snare, certain to end in loss and disaster. In short, the wish being father to the thought, Cleveland was held up to the gaze of the world as an illustration of the folly of the Independent movement and as a warning to investors.

It would be idle to say that these things were without effect. But there were men at hand wise enough to understand what were the real causes underlying the disaster. They knew that a telephone investment is not a speculation, but a legitimate business proposition, amenable to the same laws of supply and demand and management as govern any other business proposition.

No mere charm can win success in telephony, whether it be of the Bell or the Independent variety. A telephone company must be conducted on business principles to attain a full measure of success, especially where there is competition. A high standard of service must be maintained, if it would deserve and keep the respect and confidence of the people, without which success cannot be expected. Every economy in management that is consistent with good service must be insisted upon. This is especially true of an Independent company, which has not the financial prestige of the Bell monopoly back of it.

The history of telephony shows that even the Bell has not been superior to correct business principles and has repeatedly suffered in consequence. A long list of financial wrecks, shattered combinations and depreciated properties testify to the need for wise management and a proper regard for the rights and needs of the people.

These men were business men. They took charge of the so-called wreck and relegated stock jobbers and schemers to the rear. Instead of men who could "look wise," men were selected who knew the business thoroughly. The result has been that

ANOTHER BELL PROPHECY DISPROVED.

the long-distance lines in Ohio are to-day making big money. The city of Cleveland has been equipped with up-to-date apparatus; modern telephone methods have been introduced; party lines and measured service have been offered with success. So the city of Cleveland, that was to be the "horrible example," illustrating the futility of Independent telephony, is to-day the leader in methods and rates and service.

On account of these things, a comparative statement of the Bell and Cuyahoga rates in this territory is not only interesting but significant. In not one item does the Independent rate equal the Bell. For unlimited telephone service in the business district, on a single party line, the former charges \$72 per year, and the latter \$84. The Bell makes no other rate, while the Cuyahoga give a two-party line rate of \$54, and a four-party rate of \$36. In the residence district the Bell charges \$60 for one party line and \$48 for two; the Independent \$48 and \$36, with an additional rate of \$24 for a four-party line service.

The rates for measured service show the same disparity in favor of the Cuyahoga company. For a one-party line business telephone the Bell rate is \$60, three hundred calls a quarter, and additional calls 3 cents. The Cuyahoga company charges \$54, three hundred and seventy-five calls a quarter, additional calls 1 cent.

The same difference is maintained all down the line. The Independent company gives a less rate and a greater number of calls. In the residence district, measured service, the rate for the one is \$45, two hundred calls per quarter; additional calls 3 cents; for the other, \$39, two hundred and fifty calls per quarter, additional calls 1 cent. The Independent company gives no two-party line measured service, but for four-party service the rates are again lower, and for what is known as "extras" they are decidedly lower.

We do not hear as much talk as formerly about Independent rates being too low, and charging that the financial statements of the Independent companies are misleading. "Wait," the Bell croaker was wont to say. "The Independents do not allow for depreciation; their prosperity is not real, only apparent." By way of reply, the Independents have gone steadily forward, making money. They have not permitted their property to depreciate. Wherever there has been a proper regard for conditions and ordinarily wise management the Independent lines are prospering.

The Cuyahoga company has accomplished much in two years. It is much to have brought order out of chaos and success out of failure. But the Ohio company has done more than that. It has given the country an object lesson which will not be soon forgotten, and has helped along the cause of Independent telephony in a great degree.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

POWER TO PAINT POLES.

The city council has ordered all trolley, electric light, Western Union, and also our telephone poles, painted within the incorporated limits of the city, and have prescribed the color for all to be white to within 6½ feet from the ground, and then black to the ground. There is nothing in the ordinance granting our franchise that would give them this power. There is no State statute providing that poles must be painted. Can the city council order poles painted? Does the police power extend beyond regulating poles that obstruct, are inconvenient, or dangerous to the public? If they can compel poles to be painted, can they prescribe what color they must be? We desire greatly to select another color, and one different from the poles of other companies here.

S. F. G.

THE term "police power" is capable of no exact definition. It is most comprehensive and far-reaching. Its exercise is calculated for the efficient protection, the enjoyment of, and control over, the lives, property, public welfare, peace, health, safety, and prosperity and morals, and it may protect the community against the injuries exercised by any citizen or artificial person of his or its own rights. It also extends to matters necessarily connected with and effecting the same or dependent thereon. In all matters pertaining to police regulation of municipalities, their ordinances, being of the nature of legislative discretion, are *prima facie* reasonable. The presumption is that any ordinance, passed within the exercise of the charter powers granted in the municipality, is reasonable, unless, from its inherent character or from evidence it is demonstrated to be unreasonable. Courts have the power to determine the reasonableness of municipal ordinances, for the decision of the municipal authorities is not conclusive. See Joyce on Electric Law. Applying these principles, the city council has no power to provide that your telephone poles must be painted if you can show that such painting as they ordered is an unreasonable regulation. The same statement is true as to the question of prescribing what the color must be.

OUSTED FROM THE STATE.

A DECREE forbidding the Cumberland Telephone and Telegraph Company from carrying on business in the State of Tennessee, except for interested service, through Tennessee, or from some other State into Tennessee, has been entered and signed in the case of State of Tennessee *ex rel.* citizens of Columbia against the Cumberland Company. From this decree appeal has been taken by the company. Council for the telephone company had excepted to numerous rulings of the Chancellor on points of evidence. Among the exceptions was an instance where the court excluded the testimony of one Leland Hume, that in 1897 the rates of the company were reasonable, and that they only made such rates in each place as were consistent with the cost of maintenance in such locality. Another instance was the refusal to permit a witness to testify that the company only got fair returns upon the money invested. Exceptions were also made by the State of Tennessee to the holding of the court that the relief sought could not be obtained on the allegation that the defendant's charges were extortionate and that its poles were put up without permission.

IOWA TELEPHONE TAX LAW INVALID.

THE Supreme Court of Iowa has upheld the judgment dismissing the suit of Layman, County Treasurer of Polk County, vs. The Iowa Telephone Company for the taxes of property omitted from taxation and not assessed for the year 1898. The code required the executive council of the State to assess the property of telephone companies by deducting from its cash value the cash value of property locally assessed, and then to determine the rate of levy, which should be as nearly equal as

and local—levied during the previous year. The tax thus levied was to be in full of all taxes except those on real estate and special assessments. The statute was enacted at the instance of those who disbelieved in the segregation of sources of tax income and favored a strong centralized system. The court held that the exemption of telephone companies from local taxation violated an article of the State Constitution, requiring corporate property to be taxed the same as that of individuals, notwithstanding the provision as to the determination of the rate of levy. This exemption from local taxation, being unconstitutional, vitiated the entire statutory scheme for the taxation of telephone companies by the State. The question then arose, how telephone companies should be taxed, and it was held that they should be taxed like other domestic corporations, upon their capital stock. The code required the corporate stock to be assessed at the place where the company's principal business is transacted, and provides that the corporate property, except real estate, shall not be otherwise assessed. The court held that corporate personality situated in a county other than that in which its principal business was transacted could not be assessed, as such county had no jurisdiction thereof. The assessment of the tax there as "omitted property" was permitted to be collaterally attacked on the ground that it was void for want of jurisdiction. *Layman vs. Iowa Telephone Company*, 99 Northwestern, 205.

BRIBERY IN CONNECTION WITH TELEPHONE FRANCHISE.

PAPERS have been filed in the \$25,000 damage suit commenced by M. H. Zacharias against Alderman Gray, of Green Bay, Wis., for defamation of character, which has revealed a plot laid by State's Attorney Deneen of Chicago to trap the corrupt officials of the city of Green Bay.

About a year ago Jones & Winters, of Chicago, asked for a franchise to operate an Independent telephone company in the city of Green Bay. This request was referred to a sub-committee of the Green Bay Common Council. In time they realized that money distributed as bribes was required before their franchises would be granted. They engaged Zacharias, who was sent to Green Bay to arrange a meeting with the city attorney of Green Bay and an alderman in Chicago, where money would be "talked." State's Attorney Deneen marked \$10,000 in bills, and waited with a detective to arrest the Green Bay officials if they accepted the money. The officials did not keep the appointment and the trap failed. The sheriff then hastened to Chicago with a warrant for Zacharias, charging him with bribery. He was brought back to Wisconsin under arrest, not demanding extradition papers. The grand jury refused to indict him, as he produced affidavits from Deneen, showing that his offer was made with the sole object of trapping the corrupt officials. He was, however, proceeded against by information, and now awaits trial. When Alderman Gray announced at a council meeting that he was offered \$10,000 for his influence by Zacharias in securing the passage of the telephone franchise, Zacharias commenced his defamation of character suit.

RE-HEARING GRANTED.

IN the case of State *ex rel.* Garner vs. Missouri & Kansas Telephone Company, an original proceeding in the Supreme Court of Missouri instituted by the city counselor of Kansas City, a motion for rehearing has been granted and the case set for the October term, 1904. The first opinion, which was adverse to the contention of relator, was summarized in the AMERICAN TELEPHONE JOURNAL of May 7. The decision has not yet been pub-



IN THE OPERATING FIELD.

IMPROVEMENTS OF THE UNITED STATES COMPANY

NEW construction work, to cost \$160,000, has been planned by the United States Telephone Company. This work will include a connection between Dayton, Ohio, and Richmond, Ind., which will give complete long distance connections through Indianapolis and St. Louis to Kansas City. The lines will be run into Cincinnati and Wheeling. Besides, many of the towns in Ohio not now having long distance connections will be given them, and the old service will be improved and extended. The improvements will be made with all possible speed.

The work of building two new trunks for through business only, between Toledo and Cleveland, has just been completed, and the lines have been cut into the long distance exchanges at both terminals. The circuits are No. 8 wire, the heaviest used for telephone purposes. On most local lines, No. 12 wire is used and for short distance trunks No. 10 wire is used.

The Independent telephone equipment between Toledo and Cleveland is now on the basis of the highest possible efficiency.

TELEPHONE ASSESSMENTS IN KANSAS.

THE State Board of Railroad Assessors, which has charge of the telephone assessments in Kansas, has issued a circular letter giving the rates of taxes for telephone apparatus. The various companies are divided into three classes according to their valuation, and the assessments are as follows:

CLASS I.

Toll Lines.—Poles, cross-arms and first wire, per mile, \$50; each additional wire, per mile, copper, \$6.00; each additional wire, iron, \$2.00; instruments, each, \$4.00.

Exchanges.—Poles, each, \$1.25; wire, per mile, copper, \$6.00; instruments, each, \$4.00; switchboards, per drop, \$1.00; automatic instruments, \$8.00.

CLASS II.

Toll Lines.—First wire, including poles, etc., iron, per mile, \$25.00; copper, per mile, \$29.00; each additional wire, iron, per mile, \$2.00; each additional wire, copper, per mile, \$6.00; instruments, each, \$4.00.

Exchanges.—Poles, each, \$1.00; wire, iron, per mile, \$2.00; wire, copper, per mile, \$6.00; switchboards, per drop, \$1.00; instruments, each, \$4.00; automatic instruments, each, \$8.00.

CLASS III.

Toll Lines.—First wire, including poles, etc., iron, per mile, \$15.00; first wire, copper, per mile, \$19.00; each additional wire, iron, per mile, \$2.00; each additional wire, copper, per mile, \$6.00; instruments, each, \$4.00.

Exchanges.—Poles, each, 75 cents; wire, iron, per mile, \$2.00; wire, copper, per mile, \$6.00; switchboards, per drop, \$1.00; instruments, each, \$4.00; automatic instruments, each, \$8.00.

There is in the neighborhood of seventy-five telephone companies in the State, with a valuation of about \$600,000.

OMITTED NAME AND NUMBER—SUIT FOR DAMAGES.

A PECULIAR telephone suit has been filed in the Marion County (Ind.) Superior Court against the recently organized Indianapolis Telephone Company. Ashjian Brothers, rug manufacturers at 460 West Seventeenth street, are the plaintiffs. In a voluminous complaint of thirty-nine pages they allege that the defendant company failed and neglected to place, print or publish their name and telephone number in the latest issue of its directory, and for this omission asks the court

to award them \$5,000 damages. They allege in a number of paragraphs numerous reasons why and how the business of the firm has suffered great loss by reason of the omission, and in addition to the \$5,000 damages demanded the court is asked to require the company to issue a new and correctly revised directory. The suit is being commented on freely and considerable interest is manifested in the outcome.

PLANS OF QUEEN CITY TELEPHONE COMPANY.

OFFICERS of the Queen City Telephone Company, which secured a victory over the Bell Telephone interests in the Probate Court, will hold an important conference in the near future. Extensive plans will be discussed for the early operation of the company, pending a final decision in the Supreme Court, to which the Bell interests announce their intention of appealing the case.

The company has employed experts to map out a line of conduits in the underground district, and this work will be reported on at the conference. The Queen City Telephone Company is incorporated at \$1,000,000, 10 per cent. of which has been paid in for use in the preliminary legal battle and for the purpose of securing subscribers, with 5,000 of whom contracts have already been made. The balance of the capital will be paid in as soon as the company is ready to go ahead with construction. The victory is considered a big one by the United States Telephone interests, which control almost all of the long distance lines in Ohio, as it will give that company an opportunity to compete with the Bell Company for the long distance business of Cincinnati.

SPANISH TELEPHONE STATISTICS.

AT the end of 1902 the State Bureau of Telegraphs in Spain presented a report covering the telephone statistics for that country, from which the following quotations are thought to be of interest to our readers.

Systems.	No. of Subscribers.	Percentage paid to the State.	Rates for Service. Service.
Barcelona	3,111	33.75	\$36—60
Madrid	2,131	20.00	60
Bilbao	1,166	34.00	24—36
Valence	1,048	31.50	50
Sabadell	435	22.50	25—48
Santander	361	12.00	18—100
Saragosse	337	20.00	20—72
S. Sébastien	329	21.00	36—60
Séville	310	10.00	40—60
Santa Cruz de Ténériffe ..	278	10.00	24—32
Las Palmas	255	12.00	40—60
Valladolid	238	10.00	40—60
Tolède	232	16.00	18
Grenada	230	10.00	30—100
Malaga	229	21.00	30—60
Alicante	211	10.00	18—48
Carthage	207	20.50	30—60

Telephone tariffs are planned upon the usual European method of an installation charge which depends partly upon the length of the subscriber's line, and in addition a certain message rate for the amount of traffic which is originated by the station. In all cases the telephone companies are required to pay a tax to the State, which varies from 10 per cent. to 34 per cent. In a general way the tariffs vary from \$5 to \$50 per station for private

lines. In cases where there is more than one person the tariffs may rise to from \$125 to \$200. The installation charge varies by units of about 300 feet in length of line, every additional 300 feet being charged at the rate of from \$2 to \$4 per annum. The above table shows the most improved of the Spanish systems, together with the State tax and the annual rate.

In addition to the systems mentioned in the preceding table there were seven official telephone exchanges, comprising seventeen substations.

ANOTHER INSTANCE OF BELL METHODS.

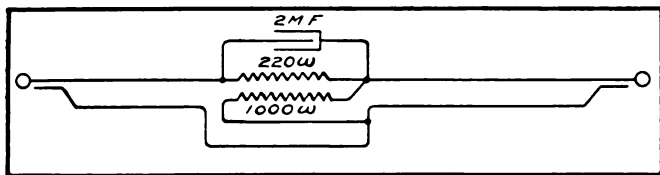
BECAUSE of the unbounded success of the Utica Home Telephone Company, the Bell company is giving great inducements to get some of the business which it has lost. If a man has a telephone installed in his place of business the company will put one in his residence free of cost. With such a ridiculous offer it is but natural to expect that the Bell's business would be brisk. The business men of the city are taking advantage of the opportunity, but at the same time they are keeping their Home telephones. The situation is being watched with interest.

A COMBINATION RING-OFF DROP.

By A. S. LISCOM.

A PROPOS of magneto ring-off drops in a recent issue, the following sketch illustrates a method of arranging ring-off cord connections that has proved very satisfactory:

This arrangement gives a series drop for certain conditions and a bridged drop for others. The winding of the bridge drop



should be high enough in resistance not to cut down the transmission in a case of toll to toll or to impair the ringing on long distance service where 1,600 ohm bells are used. I find that the two windings should start from the common contact to give a maximum efficiency, as some arrangements of the two windings would tend to neutralize the magnetic field.

ENLARGED QUARTERS FOR THE TOPEKA INDEPENDENT TELEPHONE COMPANY.

THE Independent Telephone Company of Topeka has purchased a new building for \$8,000 which will be used for its offices and also for its exchange. This new building is two stories high, and is one of the best properties in the city. It will be remodeled at once, as the business of the telephone company is rapidly outgrowing its present quarters. New subscribers are being secured at the rate of 150 a month, there being at present 2,500 subscribers. It is expected that the 3,000 mark will be passed by the time the transfer of the switchboard is made to the new building.

SAN FERNANDO VALLEY, CAL., CAPITULATES.

THE capture of the San Fernando Valley by the Independents was begun by the Fernando people (who had previously been sub-licensees of the Bell Co.) ordering out all their instruments and installing new ones of their own purchasing, buying and installing forty-one in all. The next step was made by the United States Telephone & Telegraph Co., running three lines through the valley touching the following points: Tropic, Burbank, San Fernando, Newhall, Sangus, Piru, Buchkorn, Filmore, Santa Paula, Santicon, Montalvo, Oxhard, Ventura, Carpenteria, Summerland and on to Santa Barbara, covering a total air line distance of 113 miles. These lines are well built of No. 12 E. L. S. copper wire throughout, forty poles being set to the mile, each averaging thirty feet in length. The work was done in three sections, all crews working to meet each other, so that the lines were up and working in a comparatively short time, and almost before the people of the valley could realize it; they had communication with Los An-

geles and the surrounding towns at less money and with service superior to that furnished by the old company.

The circuits are so arranged as to permit testing at all times, without asking any station to open the line or to cut it out. There is also provided for switching points one local and two through lines—one of the latter being to the town of Santa Barbara, which has 700 telephones, and the other to Ventura, where an exchange is being arranged for. At San Fernando there are now 41 subscribers, with a great demand for more.

On June 4 the Pacific Coast Telephone Construction Co. was incorporated with \$250,000 capital, there being 2,500 shares of \$100 each. The directors are Messrs. Guthridge, Zahm, Platt, Wright and Boise, all of Los Angeles. A forward movement in the way of building more or less isolated plants will be begun at once, the majority of the local franchises having already been secured by the company.

It is the intention of this company to honeycomb southern California with Independent telephone systems, each intercommunicating with the other.

AN INDEPENDENT COMPANY FOR MILWAUKEE, WIS.

THE Independent Consolidated Telephone Company has applied for a franchise to operate telephone systems in Milwaukee and Waukesha. This company now covers the western part of Wisconsin and has toll lines connecting Dubuque, St. Paul and Minneapolis. The company is now building lines east through Waukesha to Milwaukee, and by next spring will have an all-copper toll line from Milwaukee to Dubuque. The territory covered by the Independent Consolidated Company is one of the richest portions of the State and unless an Independent system is granted franchises in Milwaukee and Waukesha the business interests of these cities will lose the trade that is its own, but at present is going to Minneapolis, St. Paul, and Chicago. A partial list of the Independent companies in the State shows that there are 16,199 Independent subscribers against the total of 3,759 of the Bell.

"Getting into Waukesha and Milwaukee," said Mr. Jacobs, representing the Consolidated Company, in an interview, "will mean the investment of considerably more than \$1,500,000, but we are prepared to go ahead with the work."

RATES OF BELL AND CUYAHOGA COMPANIES.

FROM time to time figures have been given in the columns of this paper to show the relative strength of the Independent movement in contrast with the Bell. Below is a comparative statement of the Bell and Cuyahoga rates in Cleveland, Ohio.

Class.	Unlimited Service.		Measured Service.	
	Bell.	Cuyahoga.	Bell.	Cuyahoga.
<i>Business:—</i>				
1 P. L.	\$84	\$72	\$60—\$54 in advance 300 calls per quarter Add. calls 3c.	\$54 375 calls per quarter Add. calls 1c.
2 P. L.	None	\$54	\$48—\$42 in advance 250 calls per quarter Add. calls 3c.	None
4 P. L.	None	\$36	\$36—? 150 calls per quarter Add. calls 3c.	\$30 250 calls per quarter Add. calls 1c.
<i>Residence:—</i>				
1 P. L.	\$60	\$48	\$45—\$39 in advance 200 calls per quarter Add. calls 3c.	\$39 250 calls per quarter Add. calls 1c.
2 P. L.	\$48	\$36	\$36—\$30 in advance 150 calls per quarter Add. calls 3c.	None
4 P. L.	None	\$24	\$24—? 150 calls per quarter Add. calls 3c.	\$21 150 calls per quarter Add. calls 1c.
<i>EXTRAS.</i>				
Extension Desk Telephone.....			\$12.00	\$8.00
Private Branch Station.....			12.00	12.00
Extra Name—Business.....			12.00*	10.00
Extra Name—Residence.....			12.00*	5.00
Extra Name—Agents.....			....	3.00

* This service in connection with measured service telephones is \$6.00.

The Cuyahoga also gives free extra name service to four names of partners or officers of any one concern. Especial attention is drawn to the difference in charge for excess calls under the measured service heading between the two companies.

TELEPHONE

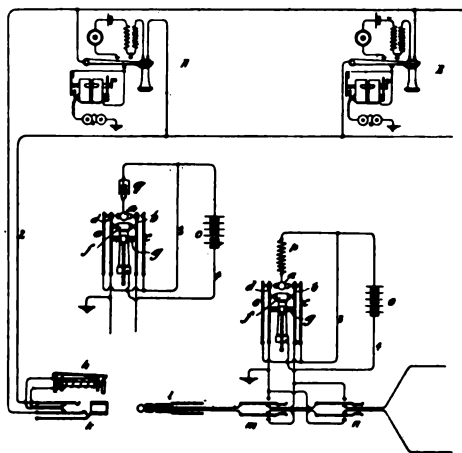


PATENTS

ELECTRIC POLE-CHANGER.

Charles E. Scribner, Jericho, Vermont, patents (No. 760,574), an improved pole changer, and assigns to the Western Electric Company. This invention is shown in the accompanying illustrations, and relates to pole-changers which are particularly adapted to telephone exchanges of moderate size. The line extends in two branches, 1, 2, to the central office provided with the usual spring jack and annunciator *h*. The pole changer is connected with a battery, *o*, and the resistance *p* of, say, 5,000 ohms. The same pole by wire 3 is branched to the contacts *c* and *e* of the pole changer. The other pole runs by wire 4 to a post which supports contacts *f* between the springs *b* *d*.

When one of the keys—as, say, *m*—is operated, the current is sent over one of the limbs—in this instance 1—and will in the first instance—that is, when contact *a* touches spring *b*—pass through the resistance or condenser *p* or *q*, and immediately thereafter as the spring *b* touches spring *c* the impulse of the battery will be thrown on the circuit. Now when the oscillating contact-arm *a* changes its direction of motion, permitting springs *b* *c* to separate, the break between the contacts *b* *c* will be bridged by the resistance or condenser, so there will be no harmful spark developed, due to the self-induction of the circuit. The same is true as to the operation of springs *d* and *e*. This invention thus provides an alternating current for operating signal-bells and annunciators



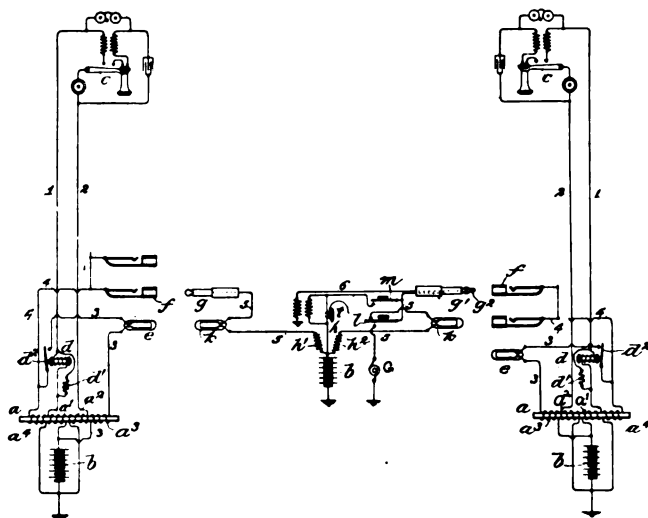
by the use of battery current and at the same time avoids sparking at the pole changer.

From the foregoing description it appears that in this pole changer, the break made on the separation of contacts *b* *c* and *d* *e* will be bridged only at the very moment of their separation, which is the instant at which the spark would be liable to be developed. Thus the resistance or condenser is included in the battery-circuit only at the precise instant or instances when needed to perform its function of preventing sparking and at other times is disconnected, so that there is no wasteful flow of current through the same.

IMPROVED TELEPHONE SWITCHBOARD CIRCUIT.

J. L. McQuarrie, Chicago, Ill., patents (No. 761,698) an improved common battery switchboard circuit and assigns to the Western Electric Company, of Chicago. The object of this invention is to provide a very simple and inexpensive common battery switchboard circuit. In the accompanying drawings *C* represents the substation and 1, 2 the lines. The subscriber signals by removing the telephone in the usual manner. This closes the circuit of battery *b* through the line relay *d*, closing local circuit 3, illuminating line lamp *e*. The insertion of the answering plug *g* into the spring jack *f* puts the supervisory lamp *k* in parallel with *e*. Then each lamp shunts out the other, so that neither is illuminated. The operator takes the order by pressing the

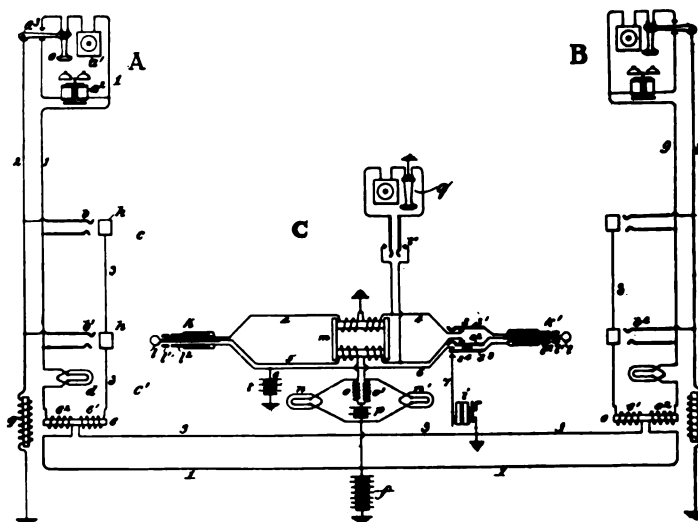
key *m* and tests the called for line in the usual manner. If the line is busy the jack touched will have a potential through battery *b* and cause the usual click. If the line is free the operator



inserts the calling plug and rings with the key *i*. Until the called party answers, his line will be unexcited and the supervisory lamp *k* will not be shunted, and consequently will burn. As soon as line relay is excited the armature connects branch 3 in parallel with supervisory lamp and both the line lamp and the supervisory lamp disappear. Talking currents are propagated from the repeating coil *a* of one line to the plug circuit repeating coil *h* and thence through the repeating coil *a* of the other line. Telephonic currents passing through the single conductors of the plug circuit find a path through both windings *a*₃ and *a*₄ of the repeating coil in parallel, so that both windings are effected. When conversation is completed the replacement of the receiver *d* magnetizes the line relays *d* *d*, cutting out the lamps *e* *e* and thus illuminating the supervisory lamps.

SWITCHBOARD CIRCUIT.

C. E. Scribner, Chicago, Ill., patents (No. 761,852) and assigns to the Western Electric Company, of Chicago. This is a patent for a common battery switchboard circuit having three wires. The original application for this patent was filed August 17, 1895,



and, consequently, has been in the Patent Office upwards of nine years. It is chiefly interesting from a historical aspect in the development of common battery switchboards, as more recent circuits would be now used in practical work.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



TRANSPOSITION.—(355.)

We wish to transpose all our wires, see sketch. Would the branches be transposed from the main line. Suppose we were to transpose one pair of wires every half mile, and when at the end find that we only have a quarter of a mile, would the distances all have to be equalized to make it come out even, and is it necessary to measure off exactly the distance in transposing?
S. C. T.

If the branch wires do not parallel or run in close proximity to power or light waves it is not necessary to transpose them, since the only reason for transposition is to destroy the effects

which is fastened the shell; *B* is the front electrode and *E* the rear electrode, which is rigidly fastened to the shell. *C* represents the granular carbon, which fills the chamber. *D* is the regular diaphragm to which the button, as the assembled parts are termed, is fastened. One side of the circuit is attached to the button at *K*, whilst the shell forms the other. The operation is as follows: When air vibrations impinge upon the diaphragm *D*, they are transmitted to the diaphragm *A*, and also to the electrode *B*. The button as a whole, however, on account of its

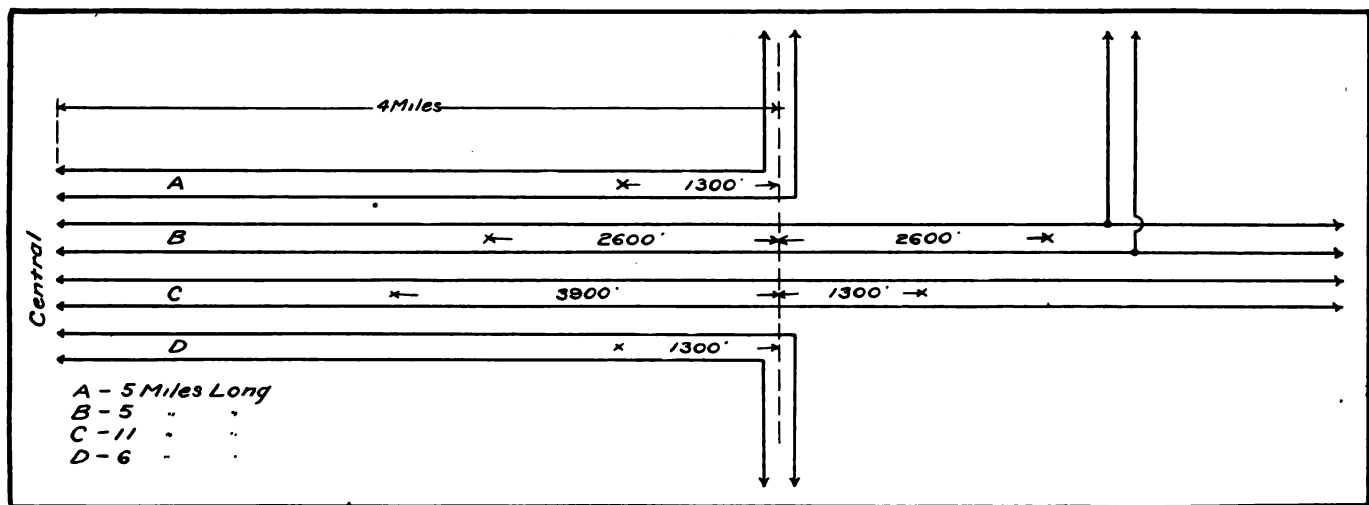


Fig. 355.

of inductance of one circuit to another. We have assumed that the four wires are on the same cross-arm, in the transposition scheme outlined in Fig. 355. This is important, for if two pairs should be above the other two pairs, the transposition would have to be made differently. Where the lines *A* and *B* turn off from the main line would be a good point to start the transpositions and work both ways. In the case of the line *A*, place a transposition on the pole approximately 1,300 feet from the starting point and repeat once every mile. The circuit *B* should be transposed at the dotted line and twice every succeeding mile in each direction. The circuit *C* should be transposed once every mile from the 3,900 foot mark to the exchange and also in the other direction 1,300 feet from the dotted line and once every mile thereafter.

The line *D* should be transposed at the 1,300 foot mark and twice every succeeding mile.

The poles on which the transpositions are to be made are those nearest to the distances mentioned, as it would be found almost impossible to have the pole distances exactly correct.

BELL TRANSMITTER.—(356.)

Is there any feature about the Bell solid back transmitter which is covered by patent, so that it cannot be used by other companies?

All the essential features of the White solid back transmitter are thoroughly covered by patents, and cannot be used except at the risk of suits for infringement.

INERTIA TRANSMITTER.—(357.)

Will you please describe the operation of what is termed an inertia transmitter?
C. W.

A cross sectional view of an inertia transmitter is shown in Fig. 357. The different parts are as follows: *S* is a shell which is lined on the side with some nonconducting insulation, *F*, such as paper or felt. *A* is a mica diaphragm, to the edges of

weight and also on account of the flexibility of the diaphragm *A*, resists, as it were, these vibrations, and allows the electrode *B* to vary its pressure upon the carbon *c*, so causing a varying flow of current through the circuit. Transmitters of this class are usually very sensitive, and also are capable of adjustment in resistance much higher than the solid back or any other type of granular carbon transmitters.

PUPIN COILS.—(358.)

How are Pupin coils constructed and connected in circuit? What is the efficiency gained by their use?
E. M. M.

It would be impossible to reply to this query in the limited

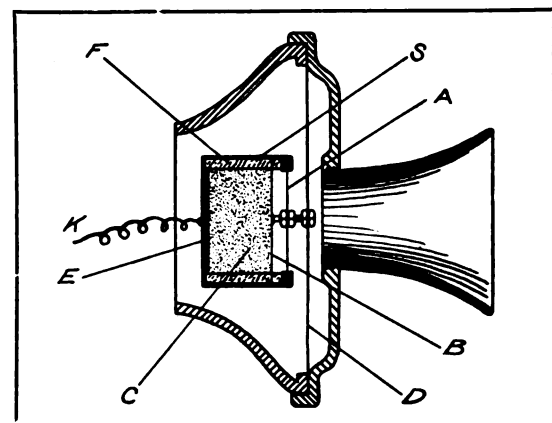


Fig. 357.

space on this page. We have an article in preparation that will cover the matter very thoroughly, and which will appear in a short while.



THE WEEK'S MESSAGES

FINANCIAL.

FISHER, ILL.—The Granger Mutual Telephone Company, of Fisher, has reduced its capital stock from \$15,000 to \$10,000.

BOSTON, MASS.—The Mexican Telephone Company reports for March gross earnings, \$23,585, an increase of \$425, and net earnings, \$10,317, a decrease of \$1,437. The number of subscribers March 31 was 4,969, an increase of 412 since March 31, 1903.

HART, MICH.—The Oceana Telephone Company, of Hart, has changed its name to the Lake Shore Telephone Company and increased its capital stock from \$50,000 to \$200,000.

ORION, MICH.—The Orion Telephone Company has increased its stock to \$5,000, the additional money to be used for new construction.

PLYMOUTH, MICH.—A new telephone line to Laphams Corners has been completed and a switchboard installed. The principal organizers of the company are: J. J. Sherer, J. A. Ware, J. C. Brayton, J. Heeney, A. Heeney, B. Stuart and E. Partridge.

AMSTERDAM, N. Y.—The Amsterdam Automatic Telephone Company has increased its capital stock from \$15,000 to \$100,000.

HUDSON, N. Y.—At a meeting of the stockholders of the Columbia Telephone Company, of Hudson, held recently, it was voted to increase the capital stock from \$50,000 to \$100,000. Of the increase, \$20,000 is to be sold at once, and the balance held in the treasury of the company.

TROY, N. Y.—The Commercial Union Telephone Company has increased its capital stock from \$10,000 to \$800,000.

BELLEFONTAINE, O.—The United Telephone Company has increased its capital stock to \$200,000.

CALDWELL, O.—The Caldwell Independent Telephone Company has increased its capital stock to \$50,000.

CLEVELAND, O.—The statement of the United States Telephone Company for April makes a very good showing for the leading independent long distance company. An increase of 13 per cent. is shown in gross, the gain being \$4,230.75. Operating expenses increased only \$2,200.28, and in consequence the company was able to carry nearly half of the gain in gross to surplus, the latter showing slightly over \$2,000 increase. The statement follows: Gross earnings, \$35,709.70; expenses and taxes, \$20,013.36; net earnings, \$15,696.34; interest on bonds, \$7,770.83; interest on bills payable, \$53.93; discount on preferred stock, \$223.17; reserve for depreciation, \$68.11; surplus for month, \$7,580.30.

COLUMBUS, O.—The Acme Telephone Company, of Philipsburg, has increased its capital stock from \$8,000 to \$15,000.

ROCKFORD, O.—The Rockford Telephone Company has increased its capital stock from \$10,000 to \$20,000.

JOHNSTOWN, PA.—The Cambria County Telephone & Telegraph Company will hold a meeting on June 27th to consider the question of issuing \$10,000 worth of preferred stock to make needed improvements.

YORK, PA.—The York Telephone Company has declared its semi-annual dividend of 2 per cent., payable July 1st.

SUMTER, S. C.—The stockholders of the Sumter Telephone Manufacturing Company have unanimously decided to increase the capital stock of the company to \$100,000. The new stock will not be put on the market, but will be subscribed for by the present stockholders. Additional buildings will be erected and new machinery installed.

WESTBY, WIS.—The Westby Telephone Company has increased its capital stock to \$10,000.

ELECTIONS.

ST. PETER, MINN.—The annual meeting of the Nicollet County Telephone Company was held here recently, and the following officers elected: M. P. Quist, president; Charles Samuelson, vice-president; C. C. Nelson, secretary and manager; P. A. Retrum, treasurer.

LE GRANDE, ORE.—The stockholders of the Imnaha, Joseph & Eureka Telephone Company have elected the following officers: F. A. McCully, president; Frank Kernan, vice-president; J. P. Rusk, secretary and treasurer. All the stock has been subscribed and contracts let for construction of the line from Joseph to Buck Horn Springs, and from Imnaha to Fruita.

CEDAR FALLS, IA.—At a recent meeting of the Cedar Falls Mutual Telephone Company, the following directors were elected: N. H. Harris, C. A. Round, L. O. Robinson, A. L. Brodie and Wilbur Hostro.

IOWA CENTER, IA.—The Iowa Center Telephone Company has elected the following officers: F. J. Bardwell, president; Charles Patterson, vice-president; C. B. Mall, secretary; Charles Latge, treasurer; C. Allers, S. Wright and J. May, directors.

FRANCHISES.

CENTRALIA, ILL.—The Farmers Telephone Company has secured a franchise in this city and will install a local exchange.

FLORA, ILL.—The officers of the Carroll County Co-Operative Telephone Association met here recently with every company in the county represented. The president of each company was named to compose a committee to confer with the Delphi Commercial Club and to undertake to get a franchise to enter Delphi.

FLORA, IND.—The Flora & Brimhurst Co-Operative Telephone Company will ask for a franchise in Flora at the next meeting of the town board.

CANASTOTA, N. Y.—The Village Trustees have granted a franchise to the Farmers Telephone Company to construct, maintain and operate lines in

this vicinity. The terms of the franchise to be agreed upon by the Board and the directors of the company. Erving Saltsman, a director of the company, who made application for the franchise, stated that as soon as it was secured, the company had plenty of money, and a first-class telephone plant would be erected in Canastota. He said the rates would be made as low as possible.

ONEIDA, N. Y.—The Earleville Telephone Company, of Earleville, represented by Parker Newton, president and general manager, has asked the Board of Public Works for a local franchise. The Columbia Telephone Company, represented by White & Potter, of Syracuse, also asked for a franchise. No definite action was taken by the Board, but it was arranged with City Attorney Beall and J. F. Durham to draw up a franchise to be presented to the Board.

ZANESVILLE, O.—The Young Hickory Telephone Company, of which B. D. Doan is chief stockholder and manager, is seeking a franchise in this city to build a line from Duncan Falls to Zanesville.

NORTH WALES, PA.—Application has been made for a charter for an independent telephone system to be operated in the upper end of Bucks County, under the name of the Franklin Telegraph and Telephone Company. Those interested are H. S. Funk, H. H. Funk, W. F. Witte, T. M. Moyer, N. S. Rice, J. J. Ott, C. B. Weaver and W. O. Ealer.

DALLAS, TEX.—Independent telephone interests have again taken up the matter of securing a franchise in Dallas. It is said that the chances for securing a franchise are excellent.

TACOMA, WASH.—Frank Mortimer and others have petitioned the City Council for a franchise for the installation of a telephone system in Tacoma.

COMBINATIONS.

AMBIA, IND.—G. S. Acker, of Ambia, has purchased the Thomas and McCombs telephone plant at Royal Center. He will install a new switchboard.

HUGO, IND. TER.—Schooler Brothers have sold out their telephone exchange in this city.

OSCEOLA, NEB.—The Golden Rod Telephone Company has been sold to Osceola, Polk County, capitalists, among whom are O. E. Mickey, cashier of the Osceola Bank; Andy Muquist, assistant cashier; E. E. Stanton, Mr. Headstrom and Mr. Skelton, of Stromsburg.

OBITUARY

R. P. DODGE, manager of the local telephone exchange at Tallmadge, O., died a few days ago.

WILLIAM A. VAIL, general manager of the Northwestern Telephone Exchange Company, of Minneapolis, died in that city recently.

PERSONAL.

T. DIMON, with the Western Electric Company, New York, has been elected associate member of the Institute of Electrical Engineers.

N. H. HARRIS has been elected a director of the Cedar Falls Mutual Telephone Company.

A. L. HILL has resigned the management of the Smithville, Tex., Telephone Company, and gone to Honey Grove, Tex., where he will install a new telephone system. R. H. Redfield has been made manager of the Smithville plant.

N. E. MANLEY, chief inspector of the Central Union Telephone Company, has been elected associate member of the Institute of Electrical Engineers.

J. S. McCULLOH, of the New York Telephone Company, has been elected associate member of the Institute of Electrical Engineers.

CHAS. A. OTIS, JR., has been elected to the directorate of the United States and Cuyahoga Telephone Companies, to take the place of J. R. Sprankle, whose death occurred some time ago.

C. S. SHARER, district wire chief for the Keystone Telephone Company, Philadelphia, Pa., has been elected associate member of the Institute of Electrical Engineers.

A. B. SMITH, assistant manager of the Woodbine Telephone Company, Iowa, has been elected associate member of the Institute of Electrical Engineers.

MR. L. S. VAN INWEGEN has been succeeded by Mr. Clarence Carr as local manager of the Hudson River Telephone Company at Port Jervis, N. Y. Mr. Carr is from Middletown and was formerly in the service of the O. & W. in that place. Mr. Van Inwegen has been transferred to Albany, the headquarters of the Hudson River Telephone Company.

MISCELLANEOUS.

ELDRIDGE, IA.—In a recent fire in this city, the Eldridge Mutual Telephone Company sustained a considerable loss.

BALTIMORE, MD.—The Maryland telephone exchange at Forest Park

was put out of working order by lightning during the storm on June 5th. Only one line of wire connecting it with the city exchange was left in operation.

LINCOLN, NEB.—The Phelps County Telephone Company, the new Independent company now building here, has over 150 instruments on its city exchange. It also has a large number of country lines, which are being connected up as fast as the lines can be built, and by July 1 expect to be serving over 500 patrons in Phelps County.

UTICA, N. Y.—The Utica Home Telephone Company has issued an additional list containing the names of over 150 new subscribers. A large amount of construction work is being done in the nearby villages.

COLUMBUS, O.—Plans for the building of the Citizens' Telephone Company at Columbus have been completed, and it is probable that work on the excavations will be begun within a few days. The structure is to be completed by December 1st. It will be four stories in height. The automatic exchange will be installed on the fourth floor, and the remainder of the building has been planned for the business and operating departments.

CARLISLE, PA.—The Canton-LeRoy Farmers Mutual Telephone Company held a meeting at East Canton recently, and by vote decided to incorporate. There are now about sixty subscribers and it is expected that the entire line will be in operation soon. Arrangements are being made to connect with the Bradford County Independent long distance company.

BRYAN, TEX.—The Commercial Long Distance Company have had to put on a night operator on account of increase in business.

SOUR LAKE, TEX.—The Southwestern Telephone Exchange, of this city, was damaged considerably during a recent fire in the storeroom under their quarters.

UNDERGROUND.

MIDDLETOWN, N. Y.—At a special meeting of the common council, the Hudson River Telephone Company presented a petition asking that it be given permission to place its wires in underground conduits.

ROSLYN, L. I., N. Y.—The New York and New Jersey Telephone Company has been granted permission to place subways in Roslyn for its entire system of wires.

NEW COMPANY NOTES

JOHNSTON CITY, ILL.—The Johnston City Telephone Company has been incorporated by C. E. McClinter, W. A. Roberts and J. E. Case. The capital stock is \$8,000.

CRAWFORDSVILLE, IND.—The City Council of Crawfordsville has adopted rules regulating the placing of wires in that city. The Home Tele-

phone Company, the Central Union Telephone Company and the telegraph companies have been notified that no guy wire shall come closer to the ground than eight feet and shall be attached to wooden poles at least eight feet above ground.

INDIANAPOLIS, IND.—The New Telephone Company, of Indianapolis, is preparing to lengthen its underground conduit system and has filed two plans showing the extent contemplated. As soon as the material is purchased work will begin.

CONESVILLE, IA.—The Conesville Telephone Company has been incorporated with a capital of \$10,000.

LENEXA, KANS.—The Interstate Telephone Company has been incorporated here with a capital of \$7,500.

FRANKFORT, KY.—The Hyden Telephone Company has been incorporated with a capital of \$3,000, to give telephone service in this vicinity.

SCOTTSVILLE, KY.—The Allen County Home Telephone Company, of Scottsville, Ky., has been incorporated with a capital stock of \$2,500. This company will operate exchanges in New Roe, Gainsville, Holland, Buttersville and Halfway. The officers are: J. W. Huntsman, president; R. Huntsman, vice-president; S. J. Read, secretary, and A. S. Gardner, treasurer.

TRAVERSE, MINN.—The Farmers' Co-Operative Telephone Company has been incorporated with a capital of \$12,000. The incorporators are J. H. Miller, C. L. Nelson, E. B. Rounsville and F. E. Briggs.

JACKSON, MISS.—A company has been organized and right-of-way is now being secured for an Independent telephone line to be built from Grenada to Meridian.

ALBANY, N. Y.—The Ravena and Medway Telephone Company has been incorporated here with a capital of \$5,000.

CAIRO, N. Y.—The Round Top, Purling and Cairo Telephone Company has been incorporated with a capital of \$400. The incorporators are W. L. Richards, J. Richards and J. B. Edgerley, all of Cairo.

COLUMBUS, O.—The Sencea Telephone Company has been incorporated here with a capital of \$20,000.

GREENEVILLE, O.—The Eldorado and West Manchester Telephone Company has been incorporated with a capital of \$40,000, to build and operate lines and exchanges at West Manchester and Eldorado, Pruble County, and in the surrounding territory. Incorporators, C. R. Leftwich and others.

TROTWOOD, O.—The Trotwood Home Telephone Company has been incorporated with a capital of \$10,000. The incorporators are G. W. Minnick, W. Swinger, J. Lambs, S. A. Blessing and W. L. Basher.

PULLMAN, ORE.—The Crumbaker Telephone Company has been incorporated here with a capital of \$10,000. The incorporators are M. Crumbaker, B. Guy and T. Neill.

MADISON, WIS.—The Mondovi Telephone Company has been incorporated with a capital of \$240,000. The incorporators are B. S. Lockwood, G. A. Stustacher, S. D. Hubbard and G. W. Gilman.



New Construction in the Field



SWEETWATER, ALA.—A line has recently been completed by Mr. M. Stokes Pearson between Dixon's Mills and Sweetwater, to be used in connection with the Thomasville and Nanafalia Telephone Company's lines, and also will connect with the local exchange at Thomasville, Ala.

JUNEAU, ALASKA.—The Chamber of Commerce has agreed to raise \$4,000 and the business men \$1,000, to construct telephone lines to different mining camps north of town.

GLEN ELLEN, CAL.—The Dunbar Improvement Club, at a meeting held recently, decided to urge the construction of a rural telephone system connecting the districts adjacent to Glen Ellen.

QUITMAN, GA.—The leading farmers in the Hickory Head community, and others across the line in Florida, held a meeting recently to arrange for the construction of telephone lines centering at this place.

MINIER, ILL.—The Minier Mutual Telephone Company has purchased about 4,000 feet of new cable, 1,300 feet of which will be used in Hopedale, 1,000 in Minier and the remainder at the Stanford exchange.

PRINCEVILLE, ILL.—The Dunlap and Alta Telephone Company is building new lines in all directions on account of the demand for service by farmers in this vicinity.

ROLLINS, ILL.—H. C. Edwards is organizing a farmers' telephone company, to construct a line from Rollins to Gray's Lake.

STREATOR, ILL.—The Streator Independent Telephone Company is soliciting subscribers in the territory adjacent to Grand Ridge.

STERLING, ILL.—The Interstate Telephone Company has made arrangements with the Tampico mutual lines and will run a trunk into its exchange. This will give the mutual exchange of over 300 subscribers a toll service with the entire Interstate system.

CRAWFORDSVILLE, IND.—The Northwestern Traction Company is installing a model telephone system along its line between Lebanon and Crawfordsville.

TERRE HAUTE, IND.—The Citizens' Telephone Company will soon extend its toll lines to Lewis.

FINCHFORD, IA.—The Finchford Mutual Telephone Company will construct a line to Benson.

MODALE, IA.—The Interstate Telephone Company has made a connection with the Woodbine telephone six miles east of Mondamin, which greatly improves the telephone service from here to Logan, Woodbine and Dunlap. It expects to make some further extensions of its line this season.

EFFINGHAM, KANS.—The Northeast Kansas Telephone Company is at work on the extension of its line from Horton to this neighborhood.

FULTON, KANS.—The Osage Valley Telephone Company, of this city, is extending its line from Harding to Devon, Kans., and expects to have it completed in another week.

SNOW PRAIRIE, MICH.—A telephone system is being constructed here.

MINNEAPOLIS, MINN.—The Tri-State Telephone Company expects to have its long-distance line through from the Twin Cities to Grand Forks, N. D., by October 1st. The line is now forty miles west of Minneapolis, and

is to be built via Litchfield and Willmar to Breckenridge, Minn., thence north to Grand Forks.

MOUNTAIN LAKE, MINN.—The Star Telephone Company, of Mountain Lake, has been granted a franchise to install a system at Butterfield. It will also install an exchange at Farmington. H. B. Brookings is the manager of the company at the latter place.

WYKOFF, MINN.—Mr. Ralph will install a local telephone exchange.

MENDOTA, MO.—The Chanter Telephone Company has been organized with a paid-up capital of \$1,200. The directors are D. D. Simmons, A. F. Williams and F. M. Tull. This company operates 100 miles of farmers' lines and has a franchise to operate a system in the town of Unionville.

FAIRFIELD, NEB.—The Farmers' Independent Telephone Line of Clay County has its lines established, taking in Harvard, Inland, Clay Center and Glenville, and will include Fairfield, Dewesse and Spring Ranch. It will unite with an Independent city telephone line in Fairfield, thus making good connection with most of the county.

STARK, NEB.—An Independent telephone company has been organized to construct a telephone line connecting Marquette, Stark and Otis.

EAST PEMBROKE, N. Y.—Poles have been set for wire connections with the Frontier Telephone Company.

PARKER, N. Y.—The Parker-Newton telephone line will be extended to Erieville.

KINDRED, N. D.—The Sheyenne Farmers' Telephone Company, of Kindred, will build eighteen miles of telephone lines this summer.

VAN WERT, O.—The Van Wert Home Telephone Company is contemplating some extensive improvements and additions to its plant in the near future.

WEST MILL GROVE, O.—The West Mill Grove Telephone Company has commenced the work of construction of its system. The stockholders of the company are mostly residents of Fostoria.

ISLAND POND, PA.—A telephone line is being constructed between this place and Starlight. It will be connected with the Winwood-Hancock line and an exchange located in this place, probably at the home of E. J. Sanford.

BLANKET, TEX.—Local parties are installing a telephone exchange here.

FORT WORTH, TEX.—The Fort Worth Telephone Company is putting up poles between Fort Worth and North Fort Worth. The company expects to begin stringing the wires the early part of next week.

SHERMAN, TEX.—At a meeting of the directors of the Grayson County Telephone Company, it was decided to make extensive improvements of the system. C. A. Schock, manager of the company, has been authorized to purchase \$50,000 worth of material.

SALT LAKE CITY, UTAH.—The Independent Telephone Company will extend its business to Butte on the north and Cheyenne on the east.

LUDINGTON, WIS.—The Ludington Telephone Company is working on a line to Fall Creek.

RACINE, WIS.—The Citizens' Telephone Company has purchased a site for \$4,000 and will install a central office. Plans are now being made to extend the toll system to Minneapolis.

TRADE NOTES

THE S. H. COUCH COMPANY, of Boston, has recently issued bulletin 8, describing their new desk set, No. 66. The company will gladly mail a copy to any one requesting the same.

THE F. BISSELL COMPANY, Toledo, O., is introducing the "Red Cross" lubricant for commutators. This is one of the best preparations on the market, and is well described as being the "Biggest little thing on the market."

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., is furnishing its different types of protector apparatus for the following cities: Warren, Pa.; St. Louis, Mo.; Spirit Lake, Ia.; Alexandria, O.; Butler, Pa.; Tampa, Fla.; Johnstown, Pa.; Chardon, O.; Pittsburg, Pa.; Sedalia, Mo.; Flushing, O.; Buckley, Ill.; Kansas City, Mo.; Superior, Wis.; New Bremen, O.; Utica, N. Y.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, Chicago, reports the largest month's business ever handled by this company. May telephone orders taxed the capacity of the factory to its limit but by working an extra force of men and keeping the plant running night and day, all customers were given satisfactory deliveries. The Monarch Company seems to realize the inconvenience caused by delayed shipments and therefore does everything possible to save such trouble.

THE LEWIS LUMBER AND MANUFACTURING COMPANY, of Hattiesburg, Miss., has opened an office at 519 Main street, Cincinnati, O., from which all sales in the future will be transacted. They have also put in a large warehouse in Cincinnati, and will carry a full line of all sizes of cross arms, so as to be able to ship quickly orders in less than carload lots. Their factory capacity in Mississippi will be doubled within the next sixty days. The company reports business to be slightly better than this time last year.

THE TELEPHONE APPLIANCE COMPANY, of 1 Madison avenue, New York, City, has placed on the market a new style of telephone directory that is unique. It consists of a cylinder that can be readily attached to any desk or wall set, in which is a ribbon mounted on a spring roller. Upon this ribbon are printed the names of parties who are often called. To find the number of a party the ribbon is pulled out till the desired information appears, and when through using, it returns automatically within the case.

THE CONTROLLER COMPANY OF AMERICA, with offices in Chicago and St. Louis, has issued a booklet entitled "Deadheaders vs. Dividends." The matter of measured and flat rate service is taken up, showing that with the aid of a Stroud Collector the question of deadheads is eliminated, and also that a subscriber is charged for no more service than he uses. This company manufactures telephone sets to accompany its collectors, called Controllaphones; also a special meter for use at the substation. To all interested the company will mail this booklet upon request.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, of Sumter, S. C., has issued three bulletins describing the apparatus it manufactures. Bulletin No. 34 deals with the switchboard apparatus this company manufactures, especial attention being called to the "Bull's Eye" type of self-restoring drop board. Bulletin No. 35 is devoted to intercommunicating apparatus of a high grade of manufacture. Bulletin No. 36 describes magneto instruments for all classes of service, and at the same time devotes a large amount of detailed description of the most important points of the apparatus used in the make-up of this class of instrument. The company will be pleased to furnish these bulletins upon request.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, N. Y., has completed the installation of a common battery exchange at Fairport, N. Y., for the Inter-Ocean Telephone and Telegraph Company. This company is also constructing a system in Charlotte and increasing the cable plants at Wellsville, Hornellsville, Waverley, and Sayre, Pa. It has also commenced the construction of toll lines from Buffalo to Jamestown. These circuits are to be of the highest grade all copper construction. A new and attractive catalogue has been issued dealing with small exchange switchboards, which will be sent on request. This company reports a large increase in business in Ohio and other Central States.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—The Ottumwa Telephone Company's plant at Ottumwa, Iowa, including Franchise and all its property. The Company owns the three-story brick building, built two years ago, in which is installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing apparatus, all of the latest and the best. 1,250 telephones are installed, with 250 names on the waiting list. The Company also owns 80 miles of toll lines. This is one of the best telephone propositions in the State of Iowa. For full particulars, maps and photographs, address the Citizens' Savings & Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa. 187

FOR SALE—One-seventh interest in Star Telephone Company for \$500. Two hundred miles of lines fully equipped. No debts. Address: L. Case, Prairie du Chien, Wis. 196

FREE Sample to Agent. Practical ready call device for telephones. Saves brain work and hours of time. Sells itself. One sale sells dozens. Seeing is believing. Send stamp. The Telephone Appliance Co., One Madison Avenue, Dept. A. T. J., New York City. 193

FOR SALE—Switchboards and Telephones, all capacities and makes, Terminals, Cross-connecting Racks, Cable, &c., at less than half cost of new. Guaranteed reliable and efficient. Chicago Telephone Apparatus Exchange, 17 S. Elizabeth St., Chicago, Ill. 184

FOR SALE—60,000 1¼ x 8 locust pins, No. 2 quality, at price of \$3.50 per 1,000, in lots of 500 pins and up, f.o.b. cars North Wilkesboro, N. C. J. S. BOGGS, Albany, Georgia. 185

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,200 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL.

GILDART BROS., Albion, Mich. 168

SUCCESSFUL and experienced telephone man desires position as manager of Independent plant in the South or West. At present manager of 500-line common battery plant with extensive toll line connections, but desires to leave as his company has been duped into a Bell sub-license arrangement that is objectionable to him. Thirty years old; temperate. Best recommendations from present and former employers. Address, Box 191, AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 191

SALESMEN WANTED.—Reliable men to carry as a side line an up-to-date line of advertising calendars sold to furniture hardware, drug, shoe and general merchants. Convenient to carry; prompt remittances. GEO. H. JUNG & CO., Cincinnati, O. 182

POSITION wanted by a practical telephone man as superintendent of a telephone system or as a salesman on the road. Experienced in all branches of operation. Address Box 195, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., N. Y. City. 195

POSITION wanted as superintendent or manager. Thoroughly experienced in magneto and common battery systems. Also with selective party line signaling. Have had charge of right-of-way department for the past two years in a district of five thousand subscribers. Experience gained with Bell company in the East. Address, Box 194, AMERICAN TELEPHONE JOURNAL, 116 Nassau Street, New York City. 194

WANTED—Second-hand Telephone Apparatus, Central Energy and Magneto Switchboards, Telephones, Bridging Bells, Transmitters, Terminals, Cross-connecting and Distributing Racks, Ringing Generators. State details, price, condition and make. C. E. W., 17 S. Elizabeth St., Chicago, Ill. 188

POSITION WANTED—An up-to-date telephone man, with best of reference as to ability and character, would like position in good Southwest town. At liberty August 1st. Address, P. O. Box 340, Cedar Rapids, Ia. 192

RAILROADS ARE COMPETING

for our Car Orders, just the same as we are competing for your Pole Orders, (and the man who can "deliver the goods" gets the order).

That means we get cars when we want them, and whatever we get helps you.

Better send us that "hurry-up" order.

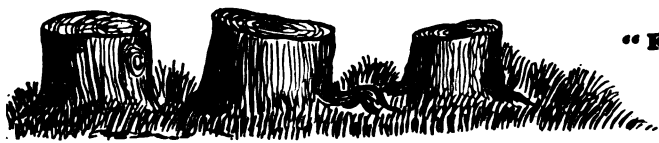
MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Bessemer Building.

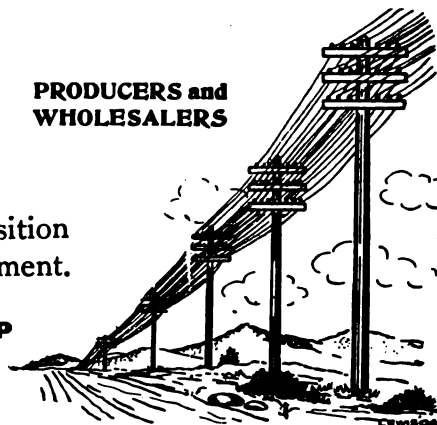
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

PRODUCERS and
WHOLESALEERS



"From the Stump
to the Line."



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-

ment.

LONG

POLES

A

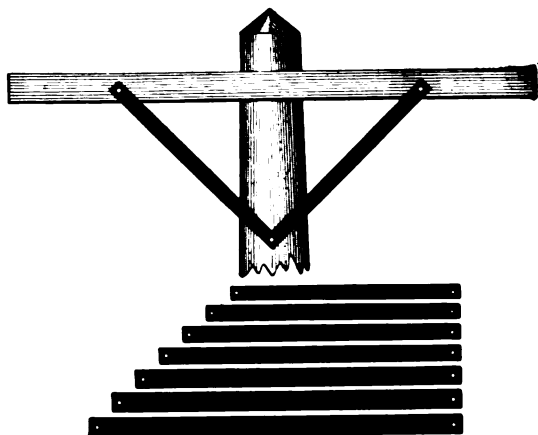
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.



CROSS ARM BRACES

THE STEEL MADE AND ALL THE
WORK DONE AT OUR OWN PLANT.

All Sizes

Quick Shipment
Plain and Galvanized

INLAND STEEL COMPANY

FIRST NAT'L BANK BLDG.

CHICAGO

JUSTICE

MAY
BE



BLIND—

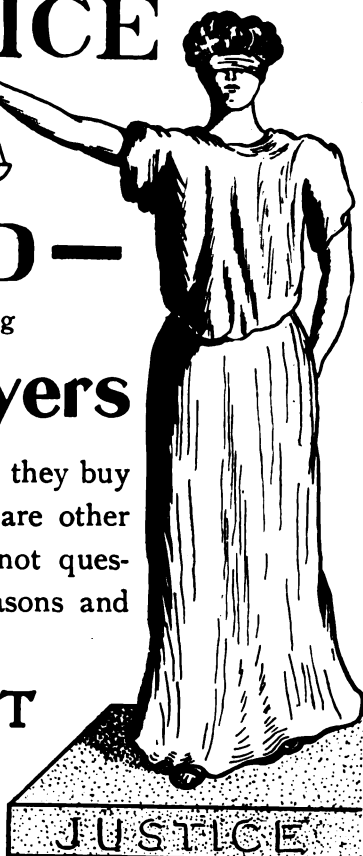
But Discerning

Pole Buyers

are not. That's why they buy
our poles. There are other
reasons, too. Why not ques-
tion us for other reasons and
prices?

SAND POINT
CEDAR CO.

Sand Point, Idaho



The **Valentine-Clark Co.**

*Bag to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before
for maintaining their prominent position among the
leaders in the cedar industry. Making a specialty
of Poles, they are identified with the leading pro-
ducing sections, concentrate their material at advan-
tageous shipping points and are in position for giv-
ing their customers the best of service.

Main Office . . .

234 La Salle Street,
Chicago, Ill.

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

Index
of the
Technical
Press

INDEX
DE LA
PRESSE
TECHNIQUE

Index
der
Technischen
Presse

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

Insulated
Electrical
Wires and Cables

RDEBLING

Bare Steel and
Copper Tele-
phone Wire

John A. Roebling's Sons Co.
TRENTON, N. J.

NEW YORK
SAN FRANCISCO

Agencies and Branches
CHICAGO
PHILADELPHIA

CLEVELAND
ATLANTA

ADVERTISERS' DIRECTORY—Continued

CONNECTORS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Erner Hopkins Co., Columbus, O.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Nagel, W. G., Electric Co., Toledo, O.
New Haven Novelty Machine Co., New Haven, Conn.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CORRESPONDENCE SCHOOL.

American School of Correspondence, Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

ENGINEERS and CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.

Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.

Central Mfg. Co., Chattanooga, Tenn.
Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Bushnell, A., Kansas City, Mo.
Churchill, E., Heron, Mont.
Electric Railway Equipment Co., Cincinnati, O.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Monroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Worcester, C. H., Co., Chicago, Ill.

POLE STEPS.

Inland Steel Co., Chicago, Ill.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.

CONTINUED ON PAGE 37.

HIPWELL MANUFACTURING COMPANY, ALLEGHENY, PA. High Grade Long Distance Telephones



FARMERS' TELEPHONES AND TELEPHONE SUPPLIES

LINEMEN TOOLS, BATTERIES, WIRE, BRACKETS, PINS,
CROSS-ARMS, BRACES, LAG BOLTS.

Quick Shipments. Prices are Right.
HIGH GRADE TELEPHONES AND SWITCHBOARDS.

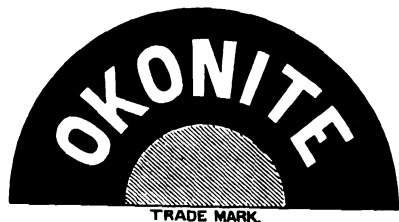
FARR TELEPHONE & CONST. SUPPLY CO., CHICAGO.



Exchange Telephones

and Private Line Telephones,
Express Switchboards, Gong
Switchboards, Large or Small
Transmitters, Receivers and
Hooks.

A set of Bookkeeping Blanks and Ledgers Free with a \$10.00 Order.



1889—Paris Exposition Medal for Rubber Insulation

1893—World's Fair Medal for Rubber Insulation

The Standard for Rubber Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., Sole Manufacturers, 253 BROADWAY, NEW YORK

WILLARD L. CANDEE, {
H. DURANT CHEEVER, { Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

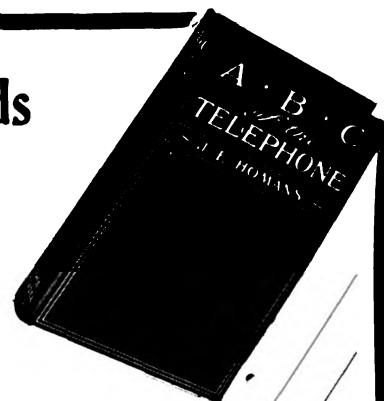
AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Two Things Every Telephone Man Needs

They are the American Telephone Journal (pub-
lished weekly), a year's subscription for \$1.00, and
a copy of the new and revised edition of "The A. B. C.
of the Telephone"; a practical book for telephone men.

This new edition has been brought thoroughly up-to-date,
and sells for \$1.00. By a special arrangement we will send a
copy of the "A. B. C." and give a year's subscription to the
American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____ State _____

American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send
me a copy of the Revised
"A. B. C." and a year's
subscription to the
Journal.

CYPRESS POLES CREOSOTED AND TREATED WITH CHLORIDE OF ZINC

If you want a telegraph pole *that will outlast any two cedar poles*, get the above. No decay. No dry rot. Nothing to give way. Test poles *sound after thirty years*. Price on long lengths same as cedar. Short lengths about one third higher. Address,

A. BUSHNELL,**903 BROADWAY,
KANSAS CITY, MO.****Cost of Construction Reduced**

By Purchasing Chestnut Telephone

POLES and POSTSFrom **FRANK MULLEN**, Ewing, IND.*Reasons Why for the Asking***Pendleton & Gilkey**

816 Lumber Exchange,

Minneapolis, Minn.**POLE PRODUCERS.**

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

MICHIGAN CEDAR CO., Ltd.

BAY CITY, MICH.

CEDAR POLES

We aim to please.

Try us with your Order.

Attractive Prices

Prompt Dispatch

Good Quality...

**LARGE SIZES OF
CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES**

For Special Use Carried in Full Stocks and Sold at Reasonable Prices

**THE MEDORA MILLING CO.,
MEDORA, INDIANA****PINS--BRACKETS**

Let us send you a few reasons why you should

BUY FROM US

**L. Prosser & Son, SCOTTSBURG,
INDIANA.****BRACKETS--X ARMS--PINS**

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:**Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.****E. CHURCHILL**

HERON, MONT.

YARDS

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR**POLES**

25 to 80 ft. long.

W. C. STERLING & SON

MONROE, MICH.

Telephone Poles

Wholesale Producers 20 Years Eleven Pole Yards

We Rush Orders...

COHN & BOCK

YELLOW PINE

CROSS ARMS

Oak Insulator Pins and Brackets**PRINCESS ANNE****MARYLAND**

We Make
a Specialty
of
Telephone
Poles.

Large Stock

16 to 25 ft.
4 to 6 in. TopsFor Rural
Lines**POLES**

YARDS:

Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**459-519 W. 22d St.
CHICAGO, ILL.

J. W. Middleton & Co.
PUBLISHERS OF
**THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing
CHICAGO.

167 Dearborn St.

Blank Books and Forms**FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.**

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

**The Telephone Printing Company
DEFIANCE, OHIO**

Do you always mention the

American Telephone Journal

when writing to advertisers? It will be appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also ALL HEART cross ties, oak and locust pins and brackets. Write us for delivered prices.
We can furnish 100 or 100,000 promptly.

E. R. ARMS, Manager.**LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.**

We've wireless wires and
horseless cabs,
But will we ever own
A cussless, waitless, out-of-
order-less
Girlless telephone?

—Life.

This Is It



See us at St. Louis,
Section 24,
Palace of Electricity.

Thousands have already
declared the Automatic
Telephone the
wonder of the
Fair.

**AUTOMATIC
ELECTRIC
COMPANY**
CHICAGO, U. S. A.

The Erner Hopkins Co. Wholesale
Electrical
Supplies
WRITE US FOR PRICES. WE CAN SAVE YOU MONEY.
The ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.
Manufacturers of BARE and TINNED
COPPER WIRE
Fine Sizes a Specialty
JAMES A. SPARGO, Pres. and Gen'l Mgr.
ROME, N. Y.
Chicago Office: 1501 Monadnock Bldg.,
CHICAGO.

Keeling & Ridge Co.
General Contractors
Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduit Work
a Specialty.
Twenty-first and Sidney Streets,
PITTSBURGH, PA.

LE ROY W. STANTON
Consulting Telephone Engineer
Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.
**ELECTRICAL ENGINEER
AND CONTRACTOR**
Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduit
Construction a Specialty.
Room 535, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.
CAPITAL. \$250,000.00.
Main Offices, 851-2-3 The Spitzer, **TOLEDO, OHIO.**
GENERAL CONTRACTORS
Telephone propositions financed, engineering estimates and reports promptly furnished.

WESTON STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters,
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,
Waverly Park, NEWARK, N. J.
BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 38.
LONDON—Elliott Bros., Century Works, Lewisham.
PARIS, FRANCE—E. H. Cadot, 11 Rue St. Georges.
New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Do you always mention the

AMERICAN TELEPHONE JOURNAL

when writing to advertisers? It will be appreciated
by all concerned if you do.

**Linemen's Outfits
Construction Tools**



Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
79 West Van Buren St., CHICAGO, ILL.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices: NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.

Burlington
Route

P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

Diagram illustrating the components of a 2-inch standard young telephone pole:

- GA. (For 2-inch Telephone Pole)
- MALLEABLE IRON CROSS-ARM SUPPORT. (For Connecting Wood Cross-Arms to Iron Poles)
- MALLEABLE IRON CROSS-ARMS. All Sizes for Telephone Poles
- TWO-PIN IRON FEEDER ARM. (For 2-inch Telephone Poles) MALLEABLE IRON
- TELEPHONE POLE OF ANY LENGTH OR STRENGTH DESIRED.
- TWENTY-FOOT TELEPHONE POLE OF 2-INCH STANDARD YOUNG.

ELECTRIC RAILWAY EQUIPMENT CO.
MANUFACTURERS OF
IRON AND STEEL
TELEPHONE POLES.

CINCINNATI, OHIO.
U. S. A.
CABLE ADDRESS: "EQUIPMENT"
LEADER CODE USED
Prices on Application.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

836 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway, New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S
(Patent)

**CONNECTORS
AND
TERMINALS**

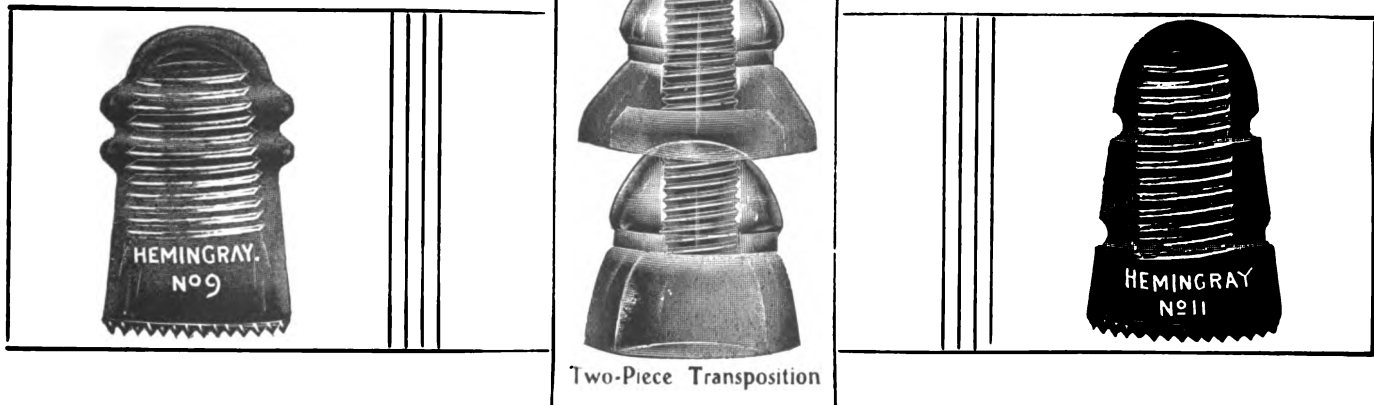
THE C. McINTIRE CO.
13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

THE STANDARD "HEMINGRAY"

ALL WITH THE "PATENT DRIP PETTICOATS."



THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

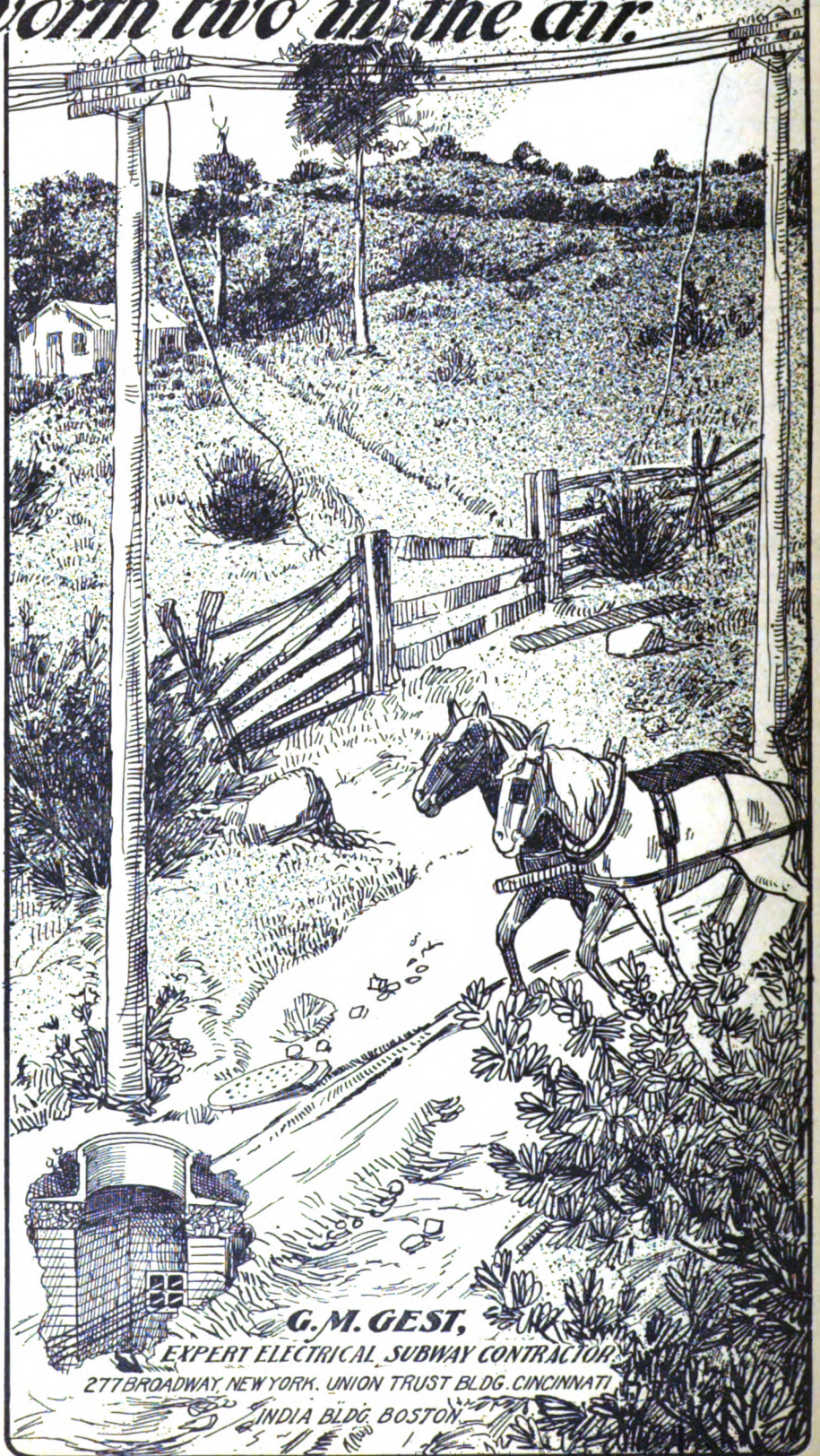
Factory, Muncie, Ind.

ESTABLISHED 1848.

ADVERTISERS' DIRECTORY—Concluded

- Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
- PAY STATIONS.**
Nagel, W. G., Electric Co., Toledo, O.
- RAILROADS.**
Chicago, Burlington & Quincy Ry. Co.
- SEALS.**
Middleton & Co., J. W., Chicago, Ill.
- STATIONERY.**
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.
- STOCK CERTIFICATES.**
Middleton & Co., J. W., Chicago, Ill.
- STORAGE BATTERIES.**
National Battery Co., N. Y. City.
- SWITCHBOARDS.**
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
- TELEPHONE BLANKS.**
Telephone Printing Co., Defiance, Ohio.
- TELEPHONE BOOTHS.**
Yesbera Manufacturing Co., Toledo, Ohio.
- TELEPHONE HOLDER.**
Chicago Writing Machine Co., Chicago, Ill.
- TELEPHONE SUPPLIES.**
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Central Tel. & Elect. Co., St. Louis, Mo.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Fahnestock Transmitter Co., New York.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Guarantee Teleph. & Equipment Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
- TERMINALS.**
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Mountain State Electric Co., Wheeling, W. Va.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
- TOLL TICKETS.**
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.
- TRANSMITTER ARMS.**
Barr, W. J., Mfg. Co., Cleveland, Ohio.
- WIRE.**
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbing's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburgh, Pa.
- WOOD PRESERVER.**
Bruno Grosche & Co., New York.

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,
EXPERT ELECTRICAL, SUBWAY CONTRACTOR
277 BROADWAY, NEW YORK. UNION TRUST BLDG. CINCINNATI
INDIA BLDG. BOSTON.

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago

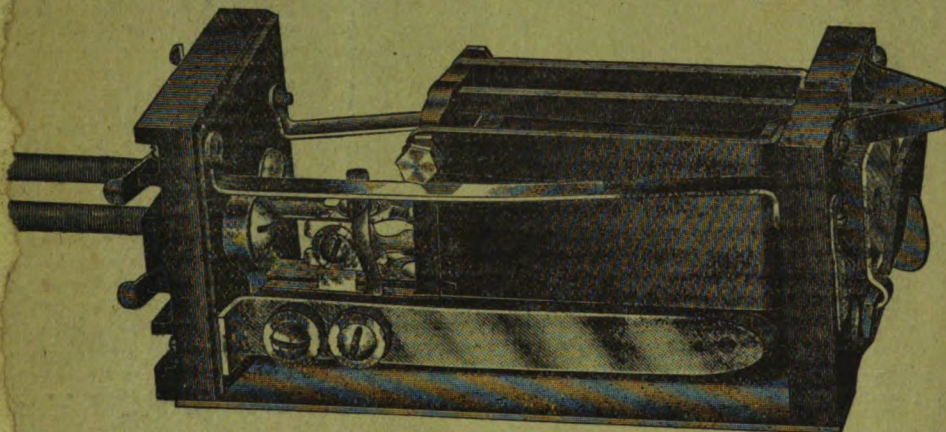
Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co

**170 Broadway
NEW YORK**

PROVED AMERICAN EXPRESS SWITCHBOARDS BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

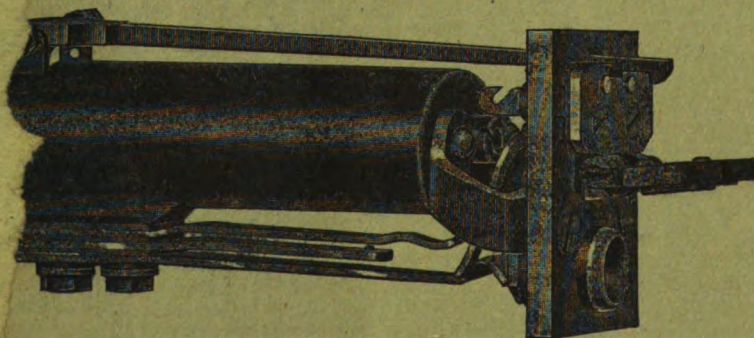
**SELF-CONTAINED DROPS AND JACKS
RAPID RINGING DEVICE**

All drops restored to normal position by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10.



**AT
POPULAR
PRICES**

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

THE AMERICAN TELEPHONE JOURNAL

A Writer

of an article on the Illinois College of Photography, in an advertising magazine recently, made the statement that the best returns were received from advertising expenditure in photographic trade journals.

"This may be explained," he continued, "by the fact that the average trade journal is read earnestly by men who read rather to learn than be amused."

The American Telephone Journal is read earnestly by men who read to learn—the men in the telephone business that manufacturers want to talk to.

It goes to more of them than do all other telephone papers combined because it is the best. They read it because they pay for it.

Edited by WILLIAM HENRY McDONOUGH

Volume 9 NEW YORK—JUNE 25, 1904—CHICAGO Number 26

PUBLISHED WEEKLY

Advertisers' Directory, Page 9

ONE DOLLAR A YEAR

Digitized by Google

The AMERICAN TELEPHONE JOURNAL

NEW YORK: 116 Nassau Street CHICAGO: Monadnock Building

Subscription price \$1.00 a year, payable in advance; foreign countries \$3.00; single copies 10 cents.
Published Every Saturday by The American Telephone Journal Co. Entered at the New York Post Office as Second Class Mail Matter.

CONTENTS.

CABLE PAIR SELECTION..... By P. A. Price
USE OF THE PEG-COUNT IN CENTRAL OFFICE OPERATION. Article 2..... By A. Dallam O'Brien
ANNUAL CONVENTION OF RAILWAY TELEGRAPH SUPERINTENDENTS
EUROPEAN TELEPHONE DEVELOPMENT THE NEW HOLBORN (LONDON) EXCHANGE
THE FINDLAY TELEPHONE DECISION

The Operating Field:

NEW YORK STATE ASSOCIATION MEETING THE FEDERAL COMPANY'S EXTENSIONS
A COMPOSITE CIRCUIT ON MAINE CENTRAL R. R. SUCCESS OF THE TOLEDO COMPANY
OHIO INDEPENDENT TELEPHONE ASSOCIATION FEES THE CITIZEN'S COMPANY WITHDRAWS
A METHOD FOR MAKING LONG POLES BIG INCREASE IN SUBSCRIBERS TO CUYAHOGA
THE BELL TRIES TO ENTER CRAWFORDSVILLE, IND. CENTRAL UNION DEFIES LAW
TELEPHONE TAXATION IN INDIANA AN INDEPENDENT COMPANY FOR COUNCIL BLUFFS
EMPLOYEES OF KANSAS CITY HOME COMPANY PRESENT GIFT TO CHIEF OPERATOR
POLICE TELEPHONE SYSTEM IN NEW YORK

QUERIES THE WEEK'S MESSAGES THE EDITOR'S PAGE PATENTS.
TRADE NOTES
WANT AND FOR SALE ADVERTISEMENTS, PAGE 416

SHEET BRASS

OF ALL TEMPER

Brass Rod, Wire and Tubing

SPECIAL SPRING GERMAN SILVER
FOR TELEPHONE WORK

Estimates given on Metal Telephone Parts or
Special Articles of Brass, Copper, German
Silver or Aluminum

Scovill Manufacturing Co.

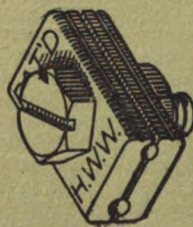
210 LAKE STREET

CHICAGO, ILL.

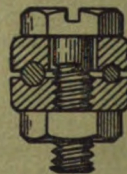
TELEPHONE CONSTRUCTION EXPERTS

agree upon the desirability of using standard devices efficiently
adapted to a variety of similar purposes. The

H. W. W. Wire-Connector



is a standard article of this
kind. Each plate has two
accurately formed grooves of
different depths. By reversal
of one plate around the bolt,
this test-connector is applicable
to two wires of the same or of differ-
ent diameters, large or small, toll or
exchange, main or branch, termin-
ating or through wires.



Simple and effective. In-
expensive and economical.

Adopted as standard by Tele-
phone Companies. Write for descriptive circular and quotations.

BENEDICT & BURNHAM BRASS AND COPPER CO.
211-213 LAKE STREET, CHICAGO, ILL.

TELEPHONES AND SWITCHBOARDS

Second Hand but Reconstructed

in a manner which guarantees

Original Appearance and Operating
Qualities.

One Thousand Exchanges are purchasing reliable apparatus of this Company
at reduced prices.

WHY NOT YOU?

Write for Stock List. All Standard and Modern Makes.

Guarantee Telephone and Equipment Company
73 & 75 W. Jackson Boulevard, Chicago, Ill.

Stop the Rubber-necks



On your Bridging Telephone Lines by the use of our

Special X-P Type Condensers

*WE WILL GLADLY TELL YOU
ABOUT THEM IF YOU WRITE*

AND THE PRICE IS LOW.

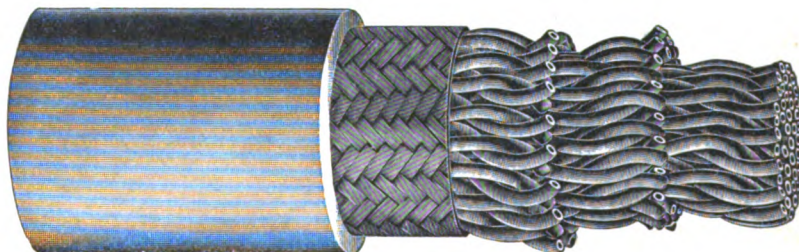
ELECTRIC APPLIANCE COMPANY
ELECTRICAL SUPPLIES TELEPHONE MANUFACTURERS
CHICAGO AND SAN FRANCISCO

WRITE FOR SAMPLE CARD OF WIRES.

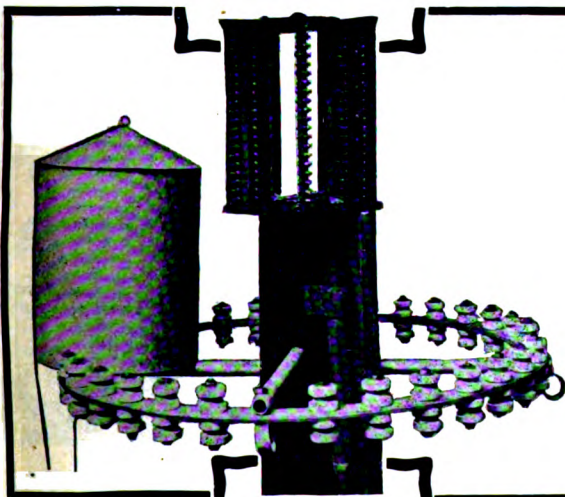
Manufacturers of

“Paranite”

**RUBBER COVERED TELEPHONE
WIRES AND CABLES :: :: ::**



INDIANA RUBBER AND INSULATED WIRE CO. JONESBORO, IND.



THE HALL TYPE D. CABLE TERMINAL WITH DISTRIBUTING RING

Designed especially for *Underground Installations*.
Each pair provided with *Absolute Lightning Protection*, and mounted on *Hard Rubber Only*.

Write for Catalogue.

Mountain State Electrical Company,
Sole Manufacturers,
WHEELING, W. VA.



NEW YORK



CHICAGO.

LONG DISTANCE

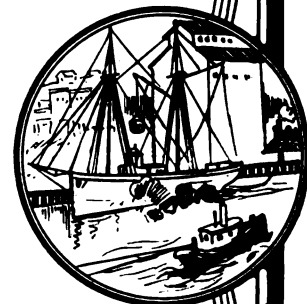
Those two words mean success for the exchange equipped to give good *long distance* service, even though it is seldom called upon to make *long distance* connections. In Ohio fully 90% of the independent toll stations are equipped with

STROMBERG-CARLSON TRANSMITTERS

The experienced telephone man knows very well why this is true. Profit by his experience.



ST. LOUIS



DULUTH

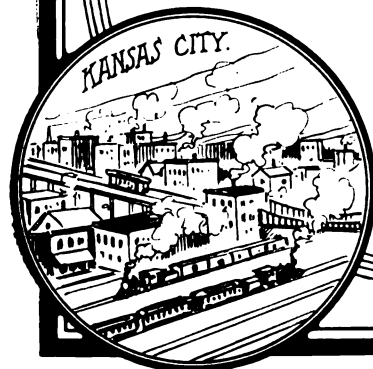
The above transmitter, also a number of our recent improvements in telephone apparatus, described in our new Bulletin, No. 11-B

Mailed free if you mention this Journal

**Stromberg-Carlson
Telephone Mfg. Co.**

Gen'l and Eastern Sales Office
Rochester, N. Y.

Sales Dept.
Chicago, Ill.

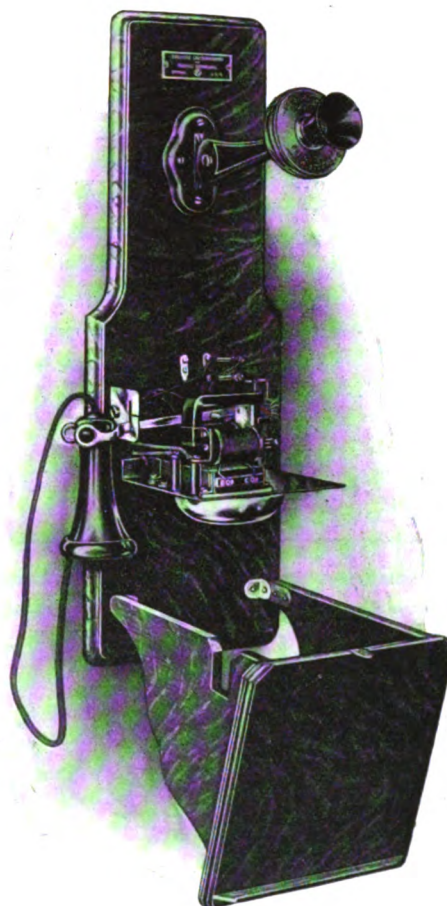
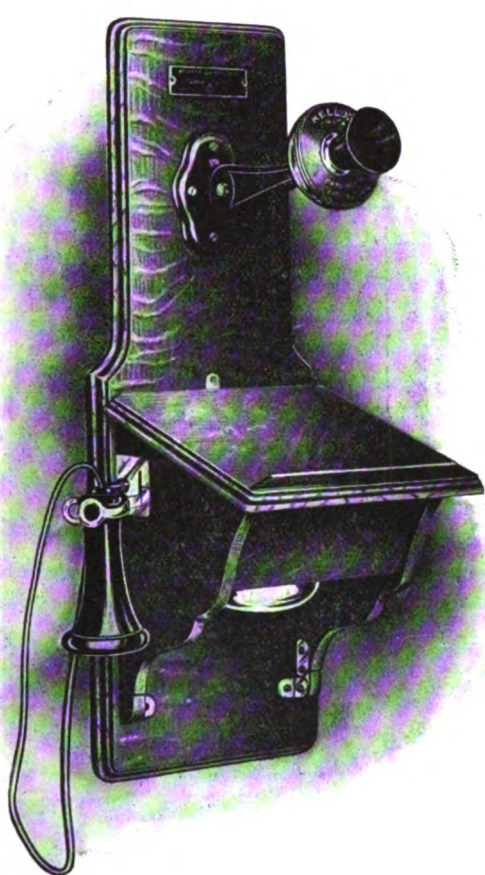


KANSAS CITY.



MINNEAPOLIS

Kellogg Four=Party Line Telephone



A *SELECTIVE Telephone that selects, and absolutely the only system that has ever succeeded in accomplishing this without aid of ground connections.*

This Telephone rings for the desired party alone, and does not ring in any way for any other party on the line.

It Rings with Alternating Current.
It Rings Loud.

It Rings with Distinctive Tone.
It Is Used in Our Largest Exchanges.

Kellogg Switchboard & Supply Co.,

GREEN and CONGRESS STS., CHICAGO.

Seymour Building,
LOS ANGELES.

Electric Building,
CLEVELAND.

Keystone Telephone Building,
PHILADELPHIA.

ARROW DRY BATTERIES

Less than 12.....Each 20 Cents
 12 to 49.....Each 18 Cents
 50 to 124.....Each 16 Cents
 Bbl. Lots, 125 to 400.....Each 15 Cents
 Two-Bbl. Lots and over.....Each 14 Cents

**ONE SAMPLE BATTERY
 FREE TO ANY TELE-
 PHONE COMPANY**

SIGN YOUR NAME HERE:

Name _____

Address _____

Mail this to Us and We will Deliver Battery Free to any Supply Dealer in St. Louis, to be shipped with your first order.

ARROW DRY BATTERY CO.
 ST. LOUIS, U. S. A.



**FOR OPEN CIRCUIT
 SERVICE ONLY**

ARROW DRY BATTERIES

VARNISHED ZINCS
 HIGH GRADE IN EVERY PARTICULAR

**THIS BATTERY IS DESIGNED
 FOR OPEN CIRCUIT SERVICE
 OF ANY CHARACTER AND
 IS ESPECIALLY DESIRABLE
 WHERE LONG LIFE IS RE-
 QUIRED.
 WITH ORDINARY USAGE THIS
 BATTERY WILL GIVE GOOD
 SERVICE FOR ONE YEAR.**

**ARROW DRY
 BATTERY CO.**
 ST. LOUIS, U. S. A.

NEW TRUNKS

ARE NOT AS GOOD AS

EXPANDED

Metal Lockers

FOR YOUR OPERATORS.

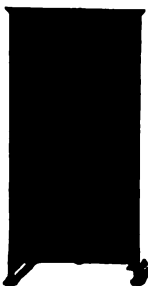
A Safe and Sanitary place to leave wraps.
 Increases the efficiency of your Exchange.
 In use in hundreds of offices. Also

**SHEET STEEL AND OPEN
 MESH MATERIAL CLOSETS**

MERRITT & CO.,

1010 Ridge Ave.,

PHILADELPHIA.



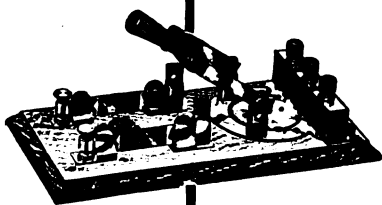
WE HELP TO MAKE

A Good
 Telephone



ADDRESS 'BARRARM,' CLEVELAND

**The New "TORNQUIST" Combination Lightning Arrester
 GROUND SWITCH, FUSE AND LEVER CUT-OUT**



King of Protectors

THE GREATEST SUCCESS IN THE TELEPHONE FIELD

BETTER PRICES

BETTER PROTECTION

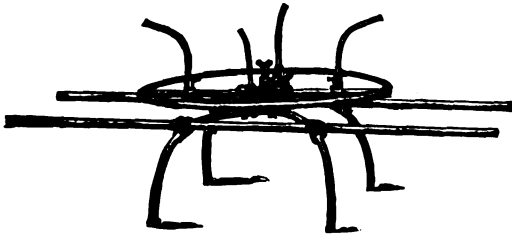
Write for Sample

HART & CO., Monadnock Bldg., Chicago

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

"READY" PAY OUT REELS

Pat. June 13, July 27, Oct. 23, 1903.



Before buying construction tools write us for prices and descriptive matter. "Ready" Reels are made in ten styles, all Iron, Cone Bearings, Light and Strong. "Ready" Reels are handled by All Jobbers.

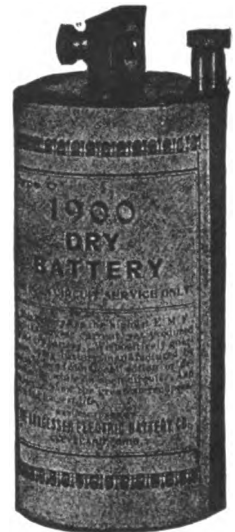
1900 Dry Batteries

The 1900 Dry Battery is an ideal Dry Battery for telephone use. Each Battery is guaranteed by the manufacturer, has long life, High Electromotive force, and large amperage.

A trial order will convince.

The W. G. Nagel Electric Co.

Toledo, O.



ADVERTISERS' DIRECTORY

American Conduit Co.....	36	Century Telephone Const. Co.....	11
American Electric Teleph. Co.....	40	Chicago, Burlington & Quincy Ry. Co.....	35
American Vitriified Conduit Co.....	39	Chicago Insulated Wire Co.....	34
Arrow Dry Battery Co.....	6	Chicago Writing Machine Co.....	—
Automatic Electric Co.....	34	Churchill, E.....	33
Barr, W. J., Mfg. Co.....	6	Cohn & Bock.....	33
Beidler, Francis & Co.....	33	Columbia Mfg. Co.....	33
Benedict & Burnham Brass & Copper Co.....	2	Connecticut Teleph. & Electric Co.....	—
Bissell Co., The F.....	—	Cook, Frank B.....	37
Bullard & McElligott.....	12	Couch, S. H., Co.....	8
Bushnell, A.....	33	Crumb, W. H., Co.....	36
Butterfield, J. F.....	34	Dickey Clay Mfg. Co., W. S.....	36
Camp, The H. B. Co.....	39	Eastern Telephone Mfg. Co.....	7
Central Mfg. Co.....	—	Electric Appliance Co.....	3

OTTO MUNK

Attorney and Counsellor at Law
305-309 Broadway NEW YORK CITY
Patents—Telephone Work Especially

Electric Railway Equipment Co...	35	Medora Milling Co.....	33
Ericsson Telephone Co.....	10	Merritt & Co.....	6
Erner Hopkins Co.....	34	Michigan Cedar Co.....	33
Farr Tel. & Const. Supply Co.....	32	Middleton, T. W., & Co.....	33
Fowler, John H.....	29	Monarch Telephone Mfg. Co.....	8
French, O. F.....	12	Mountain State Electric Co.....	3
Gest, G. M.....	38	Mullen, Frank.....	33
Guarantee Telephone & Equipment Co.....	9	Munk, Otto.....	9
Hart & Co.....	6	Nagel, W. G., Electric Co.....	9
Hemingray Glass Co.....	—	National Battery Co.....	9
Hipwell Mfg. Co.....	—	National Telephone Supply Co.....	32
Imperial Finance & Cons Co.....	34	National Wire Corporation.....	35
Indiana Rubber & Insulated Wire Co.....	—	Nungesser Electric Battery Co.....	—
Index of the Technical Press.....	30	Okonite Company.....	—
Inland Steel Co.....	30	Pacific Coast Pole Co.....	30
International Telephone Mfg. Co.....	30	Pendleton & Gilkey.....	33
Keeling & Ridge Co.....	34	Pignolet, L. M.....	31
Kellogg Switchboard & Supply Co.....	34	Pittsburg Lake Superior Iron Co.....	29
Klein, Mathias, & Sons.....	34	Prosser & Son, L.....	33
Lanz, M., & Sons.....	12	Roche, Wm.....	8
Lewis Lumber & Mfg. Co.....	33	Roebbling's, John A. Sons Co.....	31
McIntire, C. Co.....	36	Sand Point Cedar Co.....	30
Maltby Lumber Co.....	29	Scovill Mfg. Co.....	2
		Spargo, James A., Wire Co.....	34
		Standard Underground Cable Co.....	—
		Standard Vitriified Conduit Co.....	36

ADVERTISERS' DIRECTORY CONTINUED ON PAGE 10.



STORAGE BATTERIES

UP-TO-DATE **TELEPHONE BATTERIES** MUST HAVE

HIGH CAPACITY

MINIMUM DEPOSIT IN BOTTOM OF CELLS

EXTREMELY LOW INTERNAL RESISTANCE

CONSTANT CURRENT FLOW

FOR FACTS AND FIGURES WRITE THE

NATIONAL BATTERY COMPANY

NEW YORK OFFICE:
253 BROADWAY.

GENERAL OFFICES AND WORKS:
BUFFALO, NEW YORK.



New and Symmetrical in Design

And constructed so as to make the working parts immediately accessible for inspection or adjustment.

Equipped with the genuine Swedish transmitter and receiver and finished in any wood desired.

SEND FOR DESCRIPTION AND PRICE

Ericsson Telephone Company

Manufacturers and Importers of

**SWITCHBOARDS, TELEPHONES
and TELEPHONE SUPPLIES**

Dept. X. **296 Broadway, N. Y.**

Stanton, L. W.....	34
Sterling, W. C., & Son.....	33
Sterling Electric Co.....	10
Stromberg-Carlson Telephone Mfg. Co.....	4
Swedish-American Tel. Co.....	12
Telephone Printing Co.....	33
Valentine Clark Co.....	30
Vought-Berger Co.....	7
Wanted, Situations, etc.....	416
Weston Electrical Instrument Co.....	34
Worcester, C. H., Co.....	29
Yesbera Mfg. Co.....	—

ATTORNEYS.

Munk, Otto, New York City.

BATTERIES.

Arrow Dry Battery Co., St. Louis, Mo.
Electric Appliance Co., Chicago, Ill.
National Battery Co., N. Y. City.
Mungesser Electric Battery Co., Cleveland, O.
Roche, Wm., New York.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

BLANKS, BOOKS AND FORMS.

Telephone Printing Co., Defiance, Ohio.

BONDS.

J. W. Middleton & Co., Chicago, Ill.

BRASS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

BOOTHES.

Yesbera Mfg. Co., Toledo, O.

CABLE CLIP.

Bullard & McElligott, Pittsburgh, Pa.
National Tel. Supply Co., Cleveland, O.

CABLES.

American Electric Tel. Co., Chicago, Ill.

Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebing's Sons Co., John A., Trenton, N. J.
Standard Underground Cable Co., Pittsburgh, Pa.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CABLE HANGERS.

Bissell Co., The F., Toledo, O.
Bullard & McElligott, Pittsburgh, Pa.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Telephone Supply Co., Cleveland, O.
Standard Underground Cable Co., Pittsburgh, Pa.

CABLE SLEEVES.

Nagel, W. G., Electric Co., Toledo, O.

CARD INDEX SYSTEMS.

Telephone Printing Co., Defiance, Ohio.

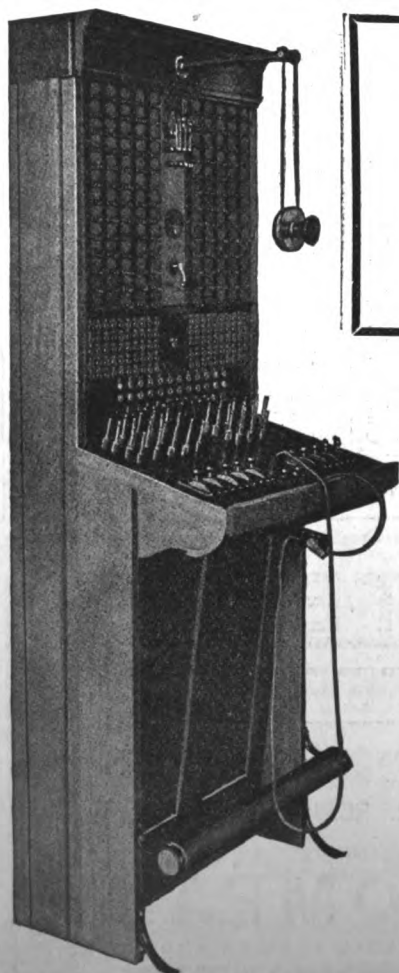
CLIMBERS.

Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.

CONDUITS.

American Conduit Co., Chicago, Ill.
American Vitrified Conduit Co., New York.
Camp Co., The H. B., New York.
Gest, G. M., Cincinnati, O.
Nagel, W. G., Electric Co., Toledo, O.
Standard Vitrified Conduit Co., New York.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.

CONTINUED ON PAGE 31.

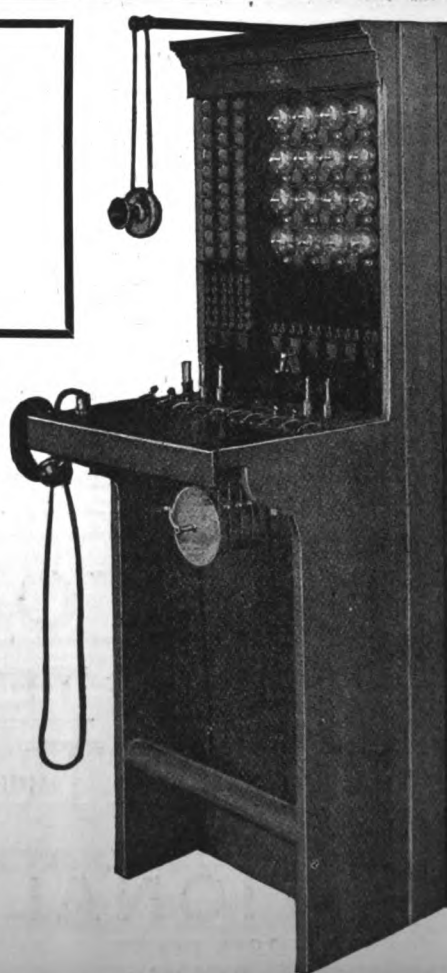


SWITCHBOARDS TELEPHONES PROTEGTORS

If You Don't See
What You Want,
Ask For It

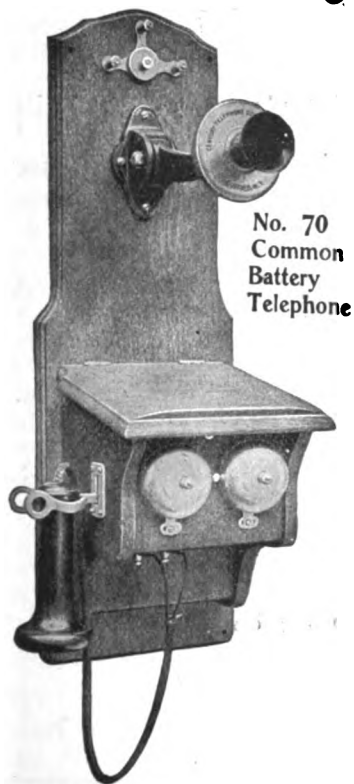
WE MAKE IT

Sterling Electric Co.
LAFAYETTE, IND.



Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

Century--100% Good--Century



No. 70
Common
Battery
Telephone

All Century Telephones Are Equipped with Century No. 5 "Platinum Electrode" Transmitters and Century No. 10 Perfection Receivers.

Century Telephones Are All Made to Give Good Service and to Give it at All Times.

CENTURY TELEPHONES ARE FULLY GUARANTEED.

We Manufacture a Complete and an Exceptionally Good Line of Telephone Apparatus Common Battery and Magneto.



No. 85
Desk Set
Common
Battery or
Magneto

We will have an Exhibit in Parlor C. Hotel Lahr, La Fayette, Ind., on June 28-29, during the Indiana Independent Telephone Convention, which will Prove Interesting to all Telephone Men.



No. 65
Magneto
Telephone

Write
for Cata-
logue
and
Prices

Century Telephone Construction Co.

General Offices and Sales Rooms, 528-540 Ellicott Square

Factory and Warehouse 481-489 Washington St., BUFFALO, N. Y.

In the Life of a Telephone Lies the **PROFIT THEREOF**

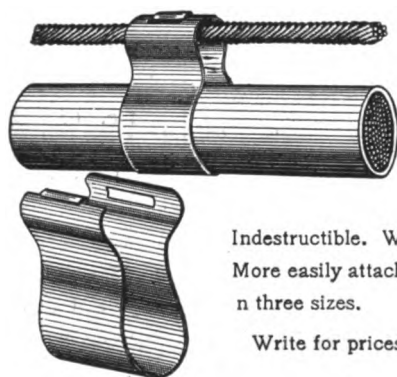
How many dead ones have you? **Swedish American Telephones** are built to live, and a new instrument costs you nothing if they succumb to any of the ailments that cause the inferior grades of Telephones to expire so regularly.

A SAMPLE INSTRUMENT

shipped on 30 days approval will convince you. If not it can be returned at our expense. We gladly take all the chances. It's cash to you to accept our offer.

WRITE TODAY

Swedish American Telephone Co.
CHICAGO



**The
Pittsburgh
Cable Clip**

Indestructible. Will not slip on or cut cable.
More easily attached than any other. Made
in three sizes.

Write for prices and particulars.

BULLARD & McELIGOTT, . . . Room 209
416 Seventh Ave., Pittsburgh, Pa.



**M. LANZ & SONS,
PITTSBURGH,
PA.**

**PLAIN
AND
GALVANIZED**

Manufacturers
of

**Telephone and
Telegraph Line Material**

4000 Magneto Telephones

FOR SALE AT

70 Cents on the Dollar

For particulars apply to O. F. FRENCH, No. 802 ELECTRIC BUILDING, CLEVELAND, OHIO

The American Telephone Journal

New York City, 116 Nassau Street.

Copyright 1904 by The American Telephone Journal Co.

Monadnock Building, Chicago.

VOLUME IX

SATURDAY, JUNE 25, 1904

NUMBER 26

EUROPEAN TELEPHONE DEVELOPMENT

TELEPHONIC developments in European countries have been along lines entirely foreign to those followed in America. The reason for this is somewhat obscure, because in almost every other industry, the general design of apparatus differs in no material way from that employed in this country. An illustration in point is the hand microphone; although it has been exploited in America, for upwards of twelve years, it has not become popular, whereas in European countries it might be taken as a standard of design. In France the old cumbersome two receiver telephone is still in use and in some cases

ments from contact with dangerous current. In America the only protection thought necessary has been that provided by lightning arresters which are supposed to open or ground the circuit in case it becomes charged with a potential foreign to that which it is supposed to operate upon. European manufacturers, however, seem to lay more stress upon the desirability of making the instruments themselves of such a construction that even if foreign currents were to enter into their mechanism, should a party be using one, he would be in no danger of injury from a shock.

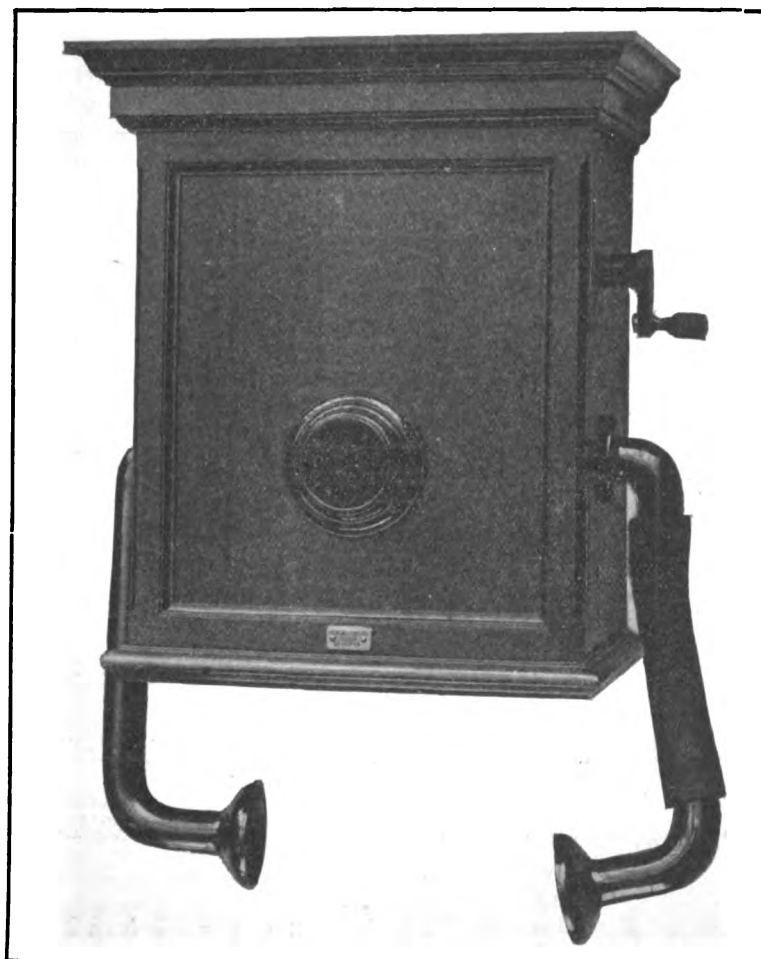


Fig. 1.

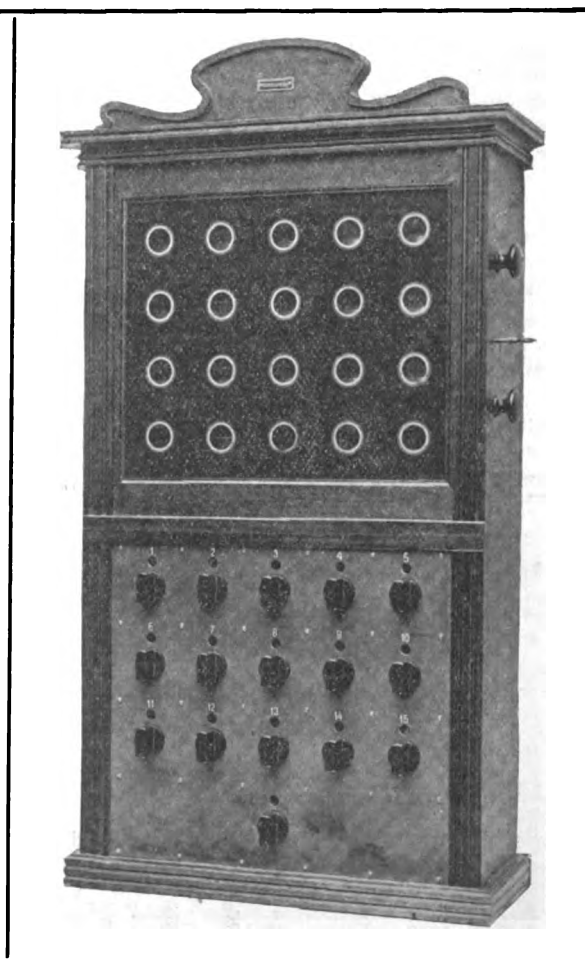


Fig. 2.

developments of the carbon pencil microphone are still used. In general, European apparatus is much more cumbersome than the American manufacture. The reason for this is perhaps the desire to make a most substantial piece of apparatus, and consequently, sacrifice looks for strength. Recent development, however, tends to be along lines similar to those employed in the States, and in many instances a remarkably fine instrument has been devised which embodies the substantial qualities of the old style instrument, together with the simplicity of design so noticeable in American apparatus.

Particular thought has been given to the protection of instru-

With this view in fact some German telephone instruments have recently been placed upon the market which are built upon lines quite foreign to American practice. It has been the object of the design of the substation, which is shown in Fig. 1, to produce an instrument in which there are no metal parts whatsoever that can by any possibility come into contact with the subscriber. The theory of this provision rests upon the idea of the possible exposure of the conversationalist to a shock from a thunder storm or a cross in the wire while in the act of using the instrument. Each substation is provided with a peculiarly designed high tension fuse capable

of protecting the circuits against 3,000, 5,000, or even 10,000, volts, as the case may be. To guard against sneak currents a sensitive carbon protector is provided, and then the line wires are brought through the back of the set so that there are no binding posts exposed.

The crank for the magneto is built of hard rubber and to the receiver two listening tubes are attached, as shown in the illustration, which are further insulated by rubber tubes. In America there have been so few cases of injury to subscribers while using substation instruments that the query at once arises as to whether in the complication here described the game is worth the candle. In Fig. 2 a new and novel arrangement of cordless switchboard is shown. It presents an exceedingly convenient design for stations comprising a dozen or more lines. A cabinet is provided, a particular part of which consists of a pane

of glass painted black containing as many holes as there are lines entering the installation. Behind each of these transparent circles is placed the proper annunciator, so that when a call is received the number of the instrument calling is displayed. Directly beneath each of the annunciators will be seen a series of handles. These are connected to switches, so arranged that by simply rotating a pair of handles any two lines may be joined together.

This style of switchboard resembles in many respects the monitor type of branch exchange which has been in use for a long while in New York and other large cities. The great value in such a switchboard is the simplicity of operation as far as the operator is concerned. Whether, however, the complication necessary in wiring for the various switches and the difficulty in locating trouble will not offset its other advantages is a doubtful question that has hitherto prevented its general use.

CABLE PAIR SELECTION

By P. A. PRICE.

IN offices where one man has to do everything without the assistance of another the duties sometimes include the picking of pairs in a new cable. The writer suggests a method that has been used by many under the circumstances, but which, however, may be new to some of our readers.

First, fan out the office end of the cable and connect it to the rack at random, being sure that the red and white components of a pair are in regular order on the rack. Open the other end of the cable—but only when the air is free of moisture—and test for “bad” pairs at the office end.

This can be done by using the contrivance shown in Fig. 1, which consists of a receiver, two cells of battery and a “pick.” A convenient “pick” can be made from a large needle, such as is used in sewing burlap sacks.

To test for “grounded” pairs, connect the receiver to the sheathing, as at *G*, and run over the terminal, or rack, connections with the pick. In case any conductors are “grounded” on the sheathing, a “click” will be heard in the receiver, due to current flowing from the battery, through the pick and faulty wire to the sheathing, and back to the receiver. Any “bad”

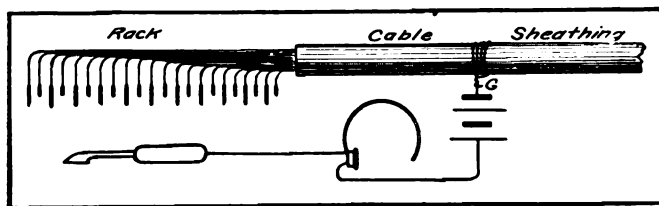


Fig. 1.

pairs thus located should be set aside and tagged as such. Fig. 2 shows method of connecting to locate grounded pairs, or conductors. “Open” conductors or “crosses” cannot be located in this way, though crosses may be by using a second pick in place of *G* and testing each pair separately, and each pair with every other pair.

Assuming the new cable test's clear, as it should, connect the “red” side of pair one, as in Fig. 2, in the office to *G* on the cable sheathing, through a battery. Then connect the white side of the same pair—pair one—to the “red” side of pair two. Connect the “white side” of pair two to the “red” side of pair three, and so on down the rack. Always connect the “white” side of a pair to the “red” side of the succeeding pair, in regular order, so that the “white” side of the last pair has nothing to be connected to.

Now go out on the terminal, with your locating contrivance (Fig. 1) and attach the battery to the cable sheathing. Touch each of the exposed “red” conductors with your pick till you get “battery,” or a click in the head-receiver. As there is only one conductor in the cable that has “battery” on it, and that is

the “red” side of pair one, you can safely tag the “red” wire and its “white” component as “pair one.”

Now attach the “white” wire of pair one to the “red” (battery) wire of the same pair, and pick over the “red” conductors again. When you get “battery” again, you know you have found the “red” side of pair two, for the battery current from the “red” side of pair one flowing back to the central office rack

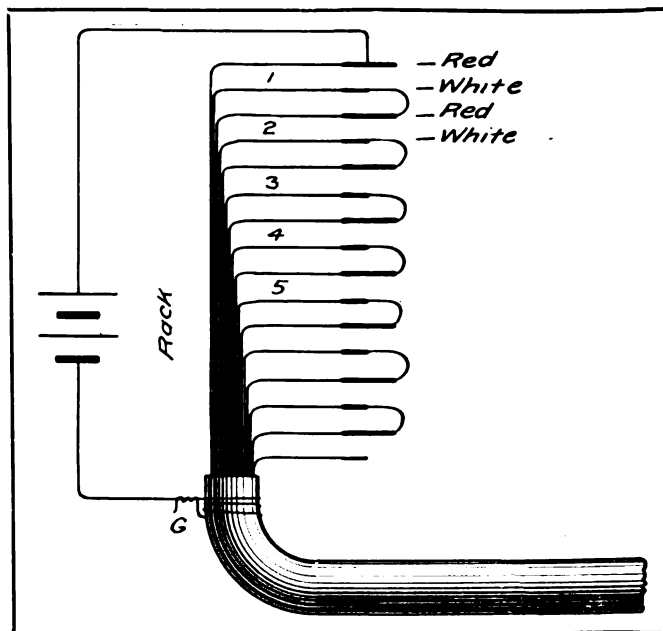


Fig. 2.

over the “white” side of pair one, and comes out to you again on the “red” side of pair two. You have the “white” side of pair two twisted with the “red” side, so no further identification is necessary. Tag this “pair two.”

Now disconnect the “white” side of pair one from its “red” mate—the battery wire—and attach the “white” side of pair two to the “red” battery wire of pair one. Go over the untagged pairs until you get “battery” again, which will, of course, be on the “red” side of pair three. Tag it as such, attach its “white” mate to the “battery wire” of pair one and locate pair four. And so on. When you locate the “red” side of the last pair you have its “white” mate without need of further identification.

In case you have a fifty-pair cable, and wish to take out pairs one to twenty-five at one terminal—as a top—and pairs twenty-six to fifty at another box, the following idea may prove available:

Connect every “red” and “white” wire together, from one to

twenty-five, as a solid conductor, Fig. 3. From the "white" side of pair twenty-five run the connecting wire to *G* on the cable sheath through a battery as shown.

Then go to the point on the cable where it is desired to tap these twenty-five pairs, and lay open the sheathing. Touch each conductor with your pick—it will go through the paper cover-

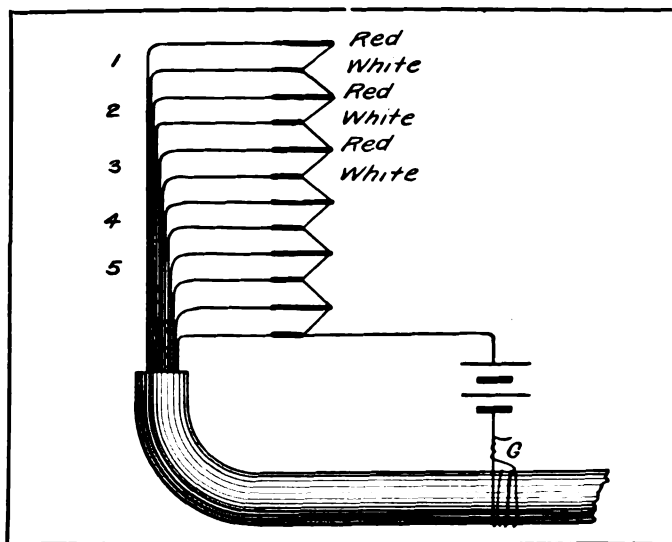


Fig. 3.

ing—and tag every wire on which you get "battery." That will locate the first twenty-five pairs. Then go to the other point, where the pairs twenty-six to fifty are desired, and tag every pair upon which you *do not* get "battery." The number of each pair can be ascertained later by the method described. Multiple taps can be made in the same method, by putting "battery" on such pairs as you wish to appear at certain points. Ordinary dry cells will give results in all these cases, but "tone test" is better. It is a noise that *will* work through almost any resistance, and cannot be mistaken when heard. An apparatus for giving "tone test" can be arranged very easily as follows:

An ordinary "buzzer" or electric bell with the gong removed

is connected to a couple of cells of battery (Fig. 4). Connect a wire to the make-and-break screw, *C*, and another to the armature spring, *P*, or the frame of the bell. (One side of the battery will do as well, providing you get right side.) Ground the wire from *C* through an ordinary condenser, as at *G*. The other wire take to the head-phone and out to the pick. When the pick strikes a grounded wire, or completes the circuit to *G* in any way, a peculiar buzzing noise is manifest in the receiver or head-phone. It can never be mistaken when once heard, and is particularly serviceable when there are "working wires" in a cable, that is, subscriber's circuits. The condenser prevents

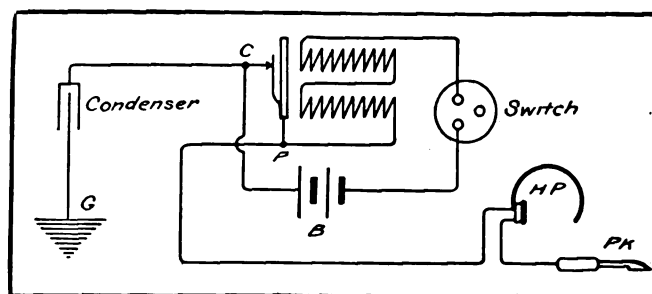


Fig. 4.

any signals being thrown on the board, and seems to take the "rough edges" off the noise itself.

The loudness of the "tone" can be regulated by the tension of the armature spring.

It can be used to take the place of the ordinary battery "click" in the location, and selection methods described in this article, and will find favor at once.

Buzzer, battery and condenser can be mounted together as one piece of apparatus, and a one-point switch included to start the buzzer. With two cells of ordinary dry battery it will run for hours without attention, the writer having had one running twenty hours continuously without exhausting the batteries to any extent.

In making the test for pairs the two batteries should be in series. Otherwise the click might be too faint to test with; or else the battery of the test set should be disconnected from the circuit.

ANNUAL CONVENTION OF THE RAILWAY TELEGRAPH SUPERINTENDENTS

THE 23d annual convention of this association was held at the English Hotel, Indianapolis, Ind., June 15-16. The attendance was the largest and most enthusiastic in the history of the association; great interest being shown in the technical and topical proceedings as well as the mechanical and electrical exhibits and demonstrations. An elaborate and enjoyable programme was provided for the entertainment of the members.

The association was organized in Chicago in 1882, with the view of improving the telegraph service, and for the promotion and advancement of the interests of the telegraph departments of the railroads. The association roster is made up of active, associate, and honorary members. To be eligible to active membership, it is requisite that one be connected in an official capacity with the telegraph, telephone, electric light, electric power or electric department of any railroad. An associate membership requires connection with a telegraph or telephone supply house or publication. Honorary members are chosen from those prominent in railway, telegraph or telephone circles, and who have by their skill and learning, furnished technical papers and otherwise contributed to the success of the association.

The first session of the convention was opened at 10 A. M., by President C. S. Rhoads. An address of welcome was then delivered by Mayor Holtzman, who said: "I deem it an honor to welcome such a body of splendid men to the most beautiful in-

land city in the world." He spoke of the uses and utility of the telegraph and telephone and paid a flattering tribute to the telegraph operator who holds the lives of the traveling public as his paramount obligation.

President Rhoads called on Mr. Charles Sheldon, of Baltimore, to respond to the mayor's welcome. Mr. Sheldon said: "I had no idea of being called upon for such a pleasant duty and I feel wholly unprepared. However, we are all delighted with the magnificent arrangements. We are also delighted with your beautiful city.....your enterprise and your open-handed hospitality. The reputation of your beautiful city as a convention center is world-wide and from appearances that reputation has by no means been exploited beyond merit. Speaking for the association we heartily thank you for your cordial welcome."

The secretary, P. W. Drew, of Milwaukee, reported ten applications for active, four for associate and two for honorary membership, which were voted on and accepted. W. W. Ryde, of Chicago, chairman of the Topic Committee, reported the following papers to be read:

1. "The Use of the Telephone Among Railways," by A. G. Francis, of the Chicago Telephone Co.; 2. "The Economical Use of the Commercial Telegraph by Holders of Franks Issued on Account of Railroad contracts," by F. G. Sherman, of New Jersey; 3. "The Telegraph Operators in the Railroad Service,"

by J. B. Tallavall, of the *Telegraph Age*; 4. "The Telegraph Service of To-Day," by J. H. Jacoby, of Pennsylvania; 5. "The use of a Modern Telephone as Applied to Railroads," by B. S. Kaiser, of the American Telegraph and Telephone Co., New York; 6. "The Typewriting Telegraph," by L. S. Wells, of Long Island City, N. Y. A number of letters and telegrams of regrets were received, among them a very facetious and humorous letter from Thos. A. Edison.

"The Use of the Telephone Among Railroads," was the subject of the first paper read by Mr. A. G. Francis, of Chicago. In considering the advantages of the branch exchange he said: "The private branch exchange acts as an intercommunicating system between the various departments, putting the heads of departments readily into communication with any desired associate or employee. The increased capacity and flexibility of the telephone service attained by the use of the branch exchange system in a railway office is found by those who have had sufficient experience to appreciate its workings, to be worth far more than it costs. The cost of installing such a system is frequently governed by the mileage of the various station circuits. When a railway company has a general office and headquarters, and its stations and terminals are several miles away therefrom, it is frequently an economy to put in two private branch exchanges and connect them by trunks. Party lines are placed principally along yards, connecting various places like the round house, freight yards, switch tenders, shanties, etc. In an isolated village these may be of advantage, but when a railway company has a private branch exchange, these should invariably be connected into the exchange. It gives them the advantage of communicating with any department that may be interested in the work at that point."

In the matter of development he said: "In Chicago five years ago, railway offices, general and freight, were almost wholly served by ground lines. At that time there were scarcely a dozen private branch exchange systems in operation. The ticket offices and freight depots were for the most part equipped with single exchange lines, consequently traffic was so congested as to make complaints of inability to get into communication with these different departments, a constant occurrence. The facilities of the few offices which had private branch exchange systems were utterly inadequate to handle their traffic.

A careful economical growth has been made. On January 1, 1904, there were: Railway switchboards, 47; Trunk lines connecting these switchboards with the telephone central exchanges, 322; Stations connected with these switchboards, 1,403.

The railway companies should be properly equipped with telephone facilities for handling their business; still, the largest private branch exchange in Chicago has only 117 telephone stations and 19 trunks, while Philadelphia has one railway private branch exchange with 442 telephone stations and 25 trunks.

Telephone facilities in freight depots should be adequate. A single item of freight lost to another road by reason of inadequate telephone service, would often have paid for one or two additional telephones for an entire year.

Some of the railway companies have gone so far as to extend telephone lines from their private exchanges through the signal towers, placing a telephone in each tower, thereby, in case of accident, rendering quick communication from the train to the despatcher, or, if necessary, the division superintendent can go in on the line and talk with the conductor of the disabled train. The railroads are in an advantageous position to build telephone lines, for their purposes, since they already own rights of way and pole lines already constructed. Students of railroad telephone development maintain that we shall soon see a remarkable development of the use of the telephone by the numerous railway companies of the country. The cutting of rates no longer gets business. The times require modern improvements and up-to-date methods. Everything that builds up a better railway service, helps to increase traffic, more business and greater earnings. In a thousand ways the telephone has made itself indispensable in modern railroading. We did not miss it when we did not have it, but now that we have it how we should miss it if it were taken away."

This paper brought out a generous discussion of the merits of the telephone in railway service. The success of the composite system allowing telephone service to be added to grounded telegraph lines without interfering in any way with the telegraph service over the same wires, was thoroughly discussed and much interest manifested. The majority of the members participating in the discussion, went so far as to assert that the telephone might some day supplant the telegraph. It was conceded that it had already become a very important factor in the direction of local, freight and work trains. A member created amusement by seriously remarking: "Do you gentlemen who are so enthusiastic for the telephone, realize that you are talking yourselves out of a job?" However, the sentiment was so favorable to the telephone that a committee is to be appointed by the president to confer with the American Railway Association in regard to authorizing the use of telephones as a standard for handling train orders the same as is now done by means of the telegraph.

Other papers were read on subjects dealing with the various phases of telegraphy and railroading and were heartily discussed during the convention. Much interest and concern was manifest in the progress being made toward the production of the "Tuppe Writing Telegraph" as presented in a paper by Mr. L. S. Wells, of New York. The paper contributed by Mr. Kaiser, of the A. T. & T. Co., New York, on "The Use of the Modern Telephone as Applied to Railroads," was received with marked attention. The paper dealt with the technical construction of the copper wire and also composite systems, and gave interesting data concerning a number of Eastern railroads and their telephone equipments.

H. C. Hope, of St. Paul, Minn., was elected president; E. E. Torry, of Jackson, Tenn., vice-president; P. W. Drew, of Milwaukee, secretary, re-elected. The next annual meeting will be held on Lookout Mountain, Chattanooga, Tenn., the 3d Wednesday in May, 1905.

The programme of entertainments closed with an elaborate banquet at the Columbia Club, after which a majority of the members departed for St. Louis.

THE NEW HOLBORN (LONDON) EXCHANGE

THE new Holborn exchange of the National Telephone Company in London, which has recently been opened, illustrates in some respects the most up-to-date telephone engineering. The telephone business of London is divided between two different systems, one operated by the National Telephone Company, which has exchanges and trunk lines in and to all the principal towns of the United Kingdom; the other system being maintained by the Government through the medium of the Post Office Department, which also controls the British telegraph system. For a number of years the telephone service of London had been of the poorest character, and it was only upon the advent of the Post Office into the field as a competitor that con-

ditions were materially changed. As a result the exchange being installed at the present time and those which have already been reconstructed are of a very high grade of design. This new exchange, called the Holborn, is situated in the heart of the city, in a district where the population, within the radius of a mile, is considerably in excess of a million. In changing over some 5,443 lines were affected, and it is reported that the change was accomplished with but few of the numerous troubles which are generally coincident with such an undertaking.

The new switchboard is 223 feet in length, and requires the services of ninety-nine operators. The ultimate capacity of the board is 15,000 lines. At the present time 4,600 direct lines are

connected up and an additional 1,000 are being installed. Each subscriber's line terminates at thirty-nine distinct jacks, which consequently gives a multiple of thirty-eight sections. The equipment is of the most modern central energy type, special attention having been given to the power plant, a consideration that has not heretofore been thought of as it should have been. The

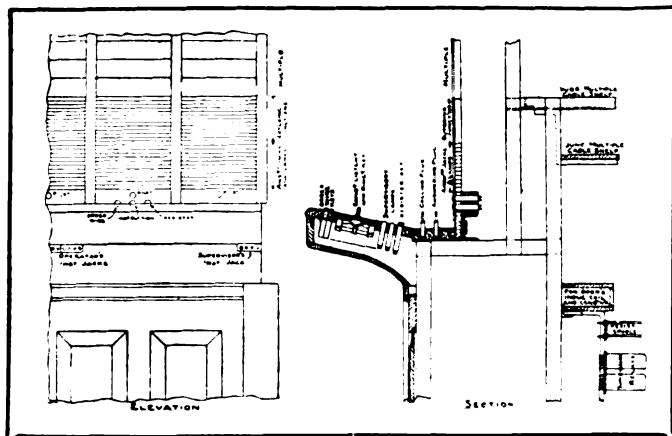


Fig. 1.

usual complement of relay tracks and distributing frames are located in what is called the test room; so that the minimum of time is required in locating and clearing trouble. One particular feature that might be mentioned is that all newspaper lines are so arranged that they can be worked from one position during the night. The exchange is situated on the upper floors of the building, the power room being in the basement. Spacious quar-

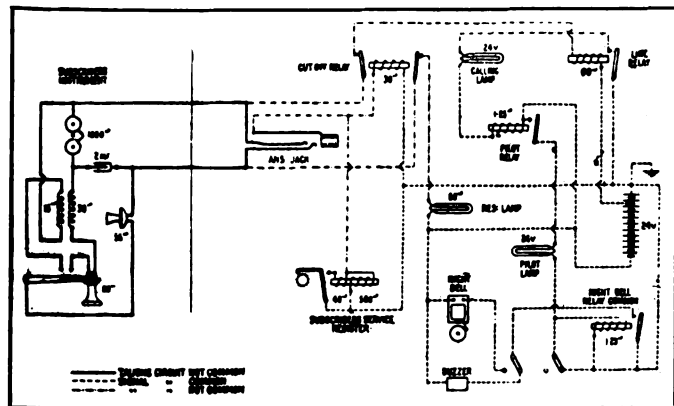


Fig. 3.

ters are provided for the operators, including dining room and recreation room.

The National Telephone Company has fifty-seven exchanges within an area of 634 square miles, which constitutes the city of London. All these exchanges are connected together with a most thorough trunking system. Some of the exchanges are upwards of thirty miles apart, which will give some idea of the extent of the system within the city proper. Trunk lines also run to the exchanges of the Post Office Department, this being compulsory by law, so that a subscriber on the Post Office system in London can reach any subscriber on the National wires in any part of the

United Kingdom. It may be interesting to note that the number of messages originating in the London exchanges is upwards of 154,000,000 per annum.

At the present time central energy switchboards are being installed at the London—Wall, Barnsbury, Hop, Eastern, Brixton and Sydenham exchanges. The London-Wall Exchange, which is

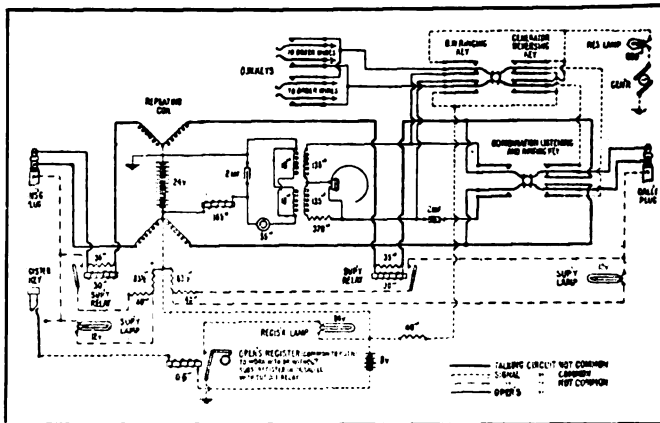


Fig. 2.

nearing completion, will have an ultimate capacity of 9,500 direct lines. The exchanges at Kensington and Battersea have already been changed over to common battery, and have been most successful in operation. The cost to the National Company for changing over to common battery will exceed \$2,500,000, the new Holborn Exchange having necessitated the expenditure of \$250,-

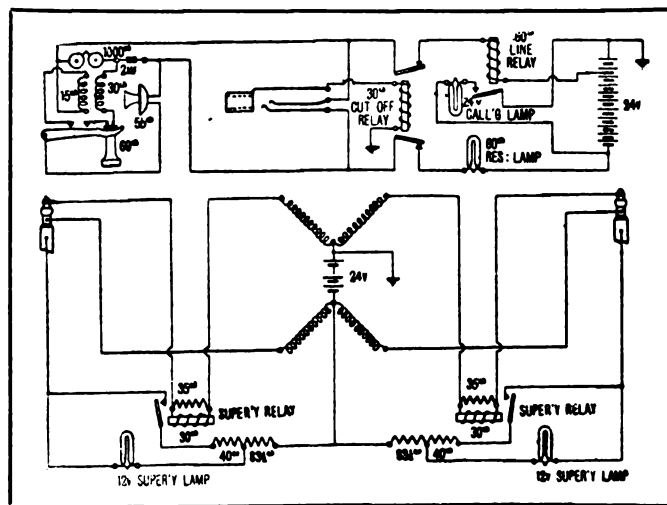


Fig. 4.

000. The circuits and drawings shown here are taken from the *London Electrical Engineer*, and illustrate some features of construction and operation. Fig. 1 illustrates a section and front elevation of a subscriber's section. (We would draw the attention of our readers to the slanting keyboard, which is becoming a feature of all modern switchboards.) Fig. 2 shows subscriber's cord circuit equipped with meter for call registering; Fig. 3 illustrates the subscriber's substation and central office connections, and Fig. 4 gives in simplified detail the circuits shown in Figs. 2 and 3.

THE FINDLAY TELEPHONE DECISION

THE action of the Supreme Court of Ohio this week in affirming unanimously the decision of the Circuit and Common Pleas Courts of Hancock County, Ohio, in the case of *The City of Findlay vs. The Findlay Home Telephone Company et al.*, very naturally emphasized the query: What principles were involved in that case, and the questions decided by the lower courts?

The council of the city of Findlay, on the second day of July,

1900, duly passed an ordinance assuming to "grant to The Findlay Home Telephone Company the right to erect, operate and maintain a telephone exchange and system of telephone lines in the city of Findlay," and section third thereof provided that "The Findlay Home Telephone Company, their associates, etc. . . . are hereby limited in the prices to be charged for regular exchange service within the corporate limits of said city of Findlay under the powers herein granted, as follows, to wit: The charge

for residence service shall not exceed \$12.00 per annum, and the charge for business, etc., all payments payable quarterly in advance."

Soon after the adoption of this ordinance, the telephone company began soliciting subscribers for telephones at the rates provided by ordinance, but after securing about 200 residence contracts, arrived at the conclusion that these rates were wholly inadequate considering the character of plant that it was necessary to build in a city with the population of Findlay. As any modification of the rate provisions as attempted to be fixed by the council, was out of the question, the telephone company concluded to disregard the rate provisions and began soliciting contracts for residence service at \$18.00 per annum, securing something more than 600 contracts before the construction of the exchange was completed. After the completion of the exchange and the company had begun giving service, an action was brought by one Charles Micklin, to prevent the telephone company from removing his telephone, he having refused to pay more than the rate of \$12.00 per annum. The city of Findlay was made party defendant in the case and filed an answer setting up the same facts that Micklin had done in his petition, and asked for same relief.

The question was tried in the court of Common Pleas and relief was refused, whereupon the city appealed to the Circuit Court. The Circuit Court decided, after a full hearing of the case

in substance, That the franchise or right to use the public ways of a municipality for the construction of telephone lines is conferred directly by statute and is subject only to control of the council in the exercise of the police powers vested in it, and that the municipality is destitute of power to fix a price to be charged for telephone service and is possessed of no beneficial interest in the public ways that may become the subject of barter, nor will supply a consideration to sustain a contract fixing the rate to be charged for such service, and such agreement is void from want of consideration. That the municipality having only performed a plain duty, that of fixing the "mode of use" and having parted with nothing of value, there is no element of estoppel in the case, and injunction will not lie to prevent a just and reasonable charge for telephone service within such municipality. Judge Day, delivering the opinion, said that the "city had no more right to fix the price of telephone charges than it had to fix the price of groceries, dry goods, or other like commodities."

This finding of the Circuit Court is what has now been affirmed by the Supreme Court. The statute in addition to making it the duty of the municipal authorities to agree with the telephone company as to the "mode of use" also contains a positive prohibition for bidding the municipality to "demand or receive any compensation, for the use of a street, etc., beyond what may be necessary to restore the pavement to its former state of usefulness."

USE OF THE PEGCOUNT IN CENTRAL OFFICE OPERATION—ARTICLE II.

By A. DALLAM O'BRIEN.

THERE are a number of methods by which an accurate record can be obtained of the number of originating and incoming calls during the twenty-four hours of the count, the method described herein being one that has stood the test of usage and is probably as accurate and satisfactory as any in use at the present time. The subscribers' operators are provided with checks, which are made out in the usual way on receipt of a call, the message rate and pay station operators following their usual course.

The operators handling flat-rate lines, on receipt of calls local to the exchange district, make out a check for each call, showing the exchange called for and omitting the calling and called number.

The information contained on these checks is illustrated in Fig. 2, which shows the form of check made out by the different classes of lines.

On calls to points outside of the exchange district all classes of lines are treated alike, and a check made out showing the number

NO CALLING 61 NO CALLED CON DIS REMARKS	F. R.	NO CALLING 68 NO CALLED 19 CON. DIS. REMARKS	M. R.	NO CALLING 85 NO CALLED 224 CON. 10 DIS. 13 REMARKS	P. S.
--------------------------------------------------	-------	-------------------------------------------------------	-------	--------------------------------------------------------------	-------

Fig. 2.

of the station calling and the number and exchange of the station called. All checks are collected hourly and stamped by a clerk with the date and the hours between which the calls originated. As the checks are collected and stamped, they are turned over to a force of clerks, who sort them according to the class of line, and again according to the exchange called for.

They are then counted and the number of calls originating from each class of line and for each separate exchange determined. This process is repeated for each hour, and at the end of the count the totals made up. The operators at the incoming circuit positions are provided with registers operated by hand, which are fastened on the top of the keyboard, a register being provided for each group of trunks, and being marked with the name of the exchange which its group represents.

On receipt of an incoming call the circuit operator presses the register of the proper group and records the call. These registers

are read by a clerk at the end of each hour and the results tabulated. It is advisable with the use of these registering devices to cover them in such a way that the circuit operator is unable to see just how many calls have been completed. This precaution is necessary, owing to the fact that operators are human, and that rivalry often exists between them, and while this may be a very commendable feature sometimes, yet where an accurate record is desired it leads to unfortunate results. In the experience of the writer cases have occurred where one circuit operator, by glancing at the register on an adjoining position, has noticed that her fellow operator has completed some forty or fifty more calls than herself, and in order not to be outdone, the first operator has manipulated her register until her total far exceeds her rivals. The limits to which this practice may approach are obvious.

At the common and ring-down trunk positions the operator is equipped with a sheet, on which appears the names of all the connecting exchanges having ring-down or common trunks, and on receipt of a call over one of these trunks the operator notes it in the proper column on her sheet. These sheets are collected at the end of every hour and a new sheet supplied. At the expiration of the count a form, such as shown in Fig. 3, is filled out, and from this comparisons can be made with past records and the needs of the office clearly seen. At the same time a report of connections, such as is illustrated in Fig. 4, is filled out, this serving as a supplement to the pegcount and giving detailed information regarding the amount of incoming and outgoing traffic, the percentage of the originating calls that are local, and the number and percentages of the total originating calls that are trunked to other points.

With the information contained in these two summaries it is not a difficult matter to see just what the operators' loads are, and by comparing these results with the figures that experience has shown to be correct, the efficiency of the central operation is at once apparent. If, for example, the pegcount shows that the calling rate per line for the flat-rate lines is 12, then on the basis that an operator can handle 1,800 flat-rate calls per day, it follows that each operator's position for handling lines of this class should be equipped with 150 lines, and as the standard common battery board usually contains 7 panels, per three-position sections, each operator must handle 2 1-3 panels, and the flat-rate panels should contain 60 lines. As the answering jacks are usually made

up of strips of 10 each, the panels must necessarily be equipped with an even multiple of 10. Assuming that the message-rate lines having a calling rate of 4, and knowing that the operator's load is 800 calls per day, it follows that each operator can handle 200 such lines, and the equipment per panel should be 80 lines. In the same way, assuming that the pegcount shows a calling rate of 4 for the pay-station lines, and on the basis of 500 calls per operator, the equipment per panel should be 50 lines. In addition to the information shown in the pegcount, and the report of connections, a record should be kept by the circuit operators of the number of calls that are delayed in completion on account of all the trunks being busy. This record should be kept on a slip of paper and should be collected for reference.

The data obtained from the ring-down trunk positions will indicate clearly when the time has arrived to substitute a group of circuit trunks for the ring-down trunks to any office, and in the

may be equalized and the calling rate per line for each operator's position be made to approach as nearly as possible to the average calling rate of all the lines of the particular class considered.

It often happens that it is necessary for an operator to handle a mixed position—that is, a position on which are terminated lines of all classes, and in this case it becomes necessary to determine the operator's load for such work. In order to illustrate the method employed in determining the proper equipment for a mixed position, a specific case is assumed and worked out. In this instance it will be considered that it is desired to equip a position so that the operator's load will be made up as follows: One-third flat rate, one-third message rate, and one-third pay station. On the basis of the loads assumed for the above classes, namely, 1,800, 800 and 500 calls, we desire the expression for the mixed load as follows: $1,800 \times 33 \frac{1}{3}\% + 800 \times 33 \frac{1}{3}\% + 500 \times 33 \frac{1}{3}\% = 1,032$, the operator's mixed load, the total being made up of 600

HOME TEL.CO														
CONDITION OF WEATHER.....					PEG COUNT RECORD ~ WEST EXCHANGE					DATE.....				
NO.OF SUBS.LINES	FLAT RATE	MESS. RATE	PAY STA.	NO.OF CIRCUIT TKS	NO.OF ORIGINATING CALLS BY HOURS									
					12-1AM	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
" " " STA'S				" " C.T. POS.										
" " ORIG. CALLS				" " CALLS OVERCT	10-11	11-12	12-1P.M.	1-2	2-3	3-4	4-5	5-6	6-7	7-8
" " CALLS PER LINE				" " COM TKS										
" " " PER STA.				" " " " POS.	8-9	9-10	10-11	11-12						
" OF CALLS BUSIEST HOUR				" " CALLS OVER C.T.										
% LOCAL				" " RING COM. TKS	NO.OF INCOMING CALLS BY HOURS									
% TRUNK				" " R.D. TK. POS	12-1AM	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
% TOLL & L.D.				" " CALLS OVER R.D. TKS										
NO.OF SUB. OPR POS.				" " CMT TKS PER POS.	10-11	11-12	12-1PM	1-2	2-3	3-4	4-5	5-6	6-7	7-8
" " CALLS PER POS.				" " R.D. TKS PER POS.										
" " LINES " "				" " COM. TKS PER POS.	8-9	9-10	10-11	11-12						
" " 25A.PTY LINES				CALLS PER TK CMT										
" " 3 " " "				" " " " COM.										
" " 4 " " "				" " " " R. D										
TOTAL NO.OF SUB. LINES				TOTAL NO.OF EMPLOYEES		TOTAL NO.SUB.POS		NO. OF NOT MADE CALLS						
" " " STA.				TOTAL NO.OF EMP. HRS.		" " " TR. "		BUSY TRUNKS						
" " " ORIG CALLS				" " " POSITIONS				DONT ANSWER						
" " " INC. CALLS				" " " HOURS				LINE BUSY						
NO.OF CALLS PER LINE				CON. PER EMP. HOUR				OUT OF ORDER						
" " " " STA.				" " " POS. "										

Fig. 3.

same way the desirability of a change from common to ring-down trunks will be indicated. As the circuit trunk is by all means the most efficient method in use for handling traffic between offices where that traffic has reached a point where there are say 75 calls each way per day, it is highly important that the exchange manager should know when this point has been reached, and to this end there is no more accurate means than the pegcount.

While the results contained in the pegcount show the average calling rates for the various classes of lines, and indicate what the average equipment of answering jacks per panel should be, it is

not safe to consider the figures obtained as giving absolutely correct results. For example, while the average calling rate for flat-rate calls, 266 message-rate calls, and 166 pay-station calls. From the calling rates for these lines is obtained an equipment of 50 flat-rate jacks, 22 message-rate jacks, and 14 pay-station jacks, or a total of 86 jacks per operator. As these jacks are distributed over 2 1-3 panels, and as the equipment per panel must be an even multiple of ten, the resulting equipment is found to be 40 lines per panel. It must be understood that the percentage make-up of the operator's load in the case illustrated is arbitrarily

HOME TELEPHONE CO.															
REPORT OF CONNECTIONS															
MADE AT															
WEST EXCHANGE												DATE _____			
ORIGINATING CALLS AT WEST FOR		INCOMING CALLS AT WEST FROM		SENDING TRUNKS CRT. R.D. COH.		CALLS PER TRUNK CRT. R.D. COH.		RECEIVING TRUNKS CRT. R.D. COH.		CALLS PER TRUNK CRT. R.D. COH.		% OF OUTGOING CALLS FOR		ORIG. CALLS DELAYED ON ACCOUNT OF BUSY TRUNKS FR.	
EAST															
NORTH															
SOUTH															
WEST															
LONG DIST.															
TOLL POINTS															
NO OF FLAT RATE LOCAL CALLS				M.R. LOCAL				P.S. LOCAL							
" " " " TRUNK "				" " " TRUNK				" " TRUNK							
" " " " TOLL H.B. "				" " TOLL AND L.D.				" TOLL AND L.D.							

Fig. 4.

rate lines may be 12 calls per day, and the equipment per panel figured on this basis be 40 lines, it does not necessarily hold, and indeed follows in few cases, that any combination of 40 flat-rate lines connected to a particular panel will show an average calling rate of 12. In order to properly distribute the subscribers' lines the exchange manager should have an intimate knowledge of the amount of business transacted by his individual subscribers in order that in distributing the lines among the operators the loads

assumed and that it is probable that the figures given would be rarely applied in practice. Moreover, in designing a switchboard and in laying out an equipment of jacks per panel, it is rare indeed that the mixed load is used in determining the distribution of jacks, and it is only useful in cases where it is desired or is necessary to have a mixed position, and in this case it shows the number of working lines which an operator handling such a position can take care of properly.



SOME PECULIAR BELL CIRCUMSTANCES.

A SIDE light has been thrown upon current telephone history this month by a statement, emanating from Bell sources in Boston and given wide circulation through the mediumship of the Associated Press. The statement is brief; but it is pregnant with significance and prophecy.

Under the caption, "Will not declare a dividend," the statement announces: "It was stated to-day that the directors of the Western Telephone and Telegraph Company will not declare a 3 per cent. dividend on the preferred stock next month, although the stock is now on a 6 per cent. cumulative basis. While the company is doing very well under the peculiar circumstances surrounding the telephone situation in the territory in which it is operating, the stock is not yet earning 6 per cent., and so long as it is not earned it will not be paid."

The Western Telephone and Telegraph Company is the successor of the Erie Company, which, it will be remembered, went to pieces two years ago. The company controls subsidiary companies operating in Minnesota, the two Dakotas, Arkansas and Texas. It started out with so many promises and assurances that the announcement of failure to pay a dividend must have been something of a painful surprise to the stockholders, notwithstanding that the stock is supposed to be on a 6 per cent. cumulative basis. A cumulative basis is cold comfort to a stockholder, when the actual earnings of his concern are admittedly not sufficient to permit of a dividend.

The statement is particularly significant to those who are familiar with the telephone situation in the West to-day, and with the inside history of telephone deals and manipulations. The Western is the successor of the Erie Company. Three years ago, Erie stock sold for 115, which indicated a decidedly prosperous state of affairs. In one year from that time, this stock which had been worth above par, was not worth the paper it was printed on; it was absolutely wiped out. Worse than that; it was not only wiped out, but the stockholders were assessed twenty-five dollars each, for the pleasure of having been connected a short time with the great Bell telephone monopoly. This was not a very paying investment for the stockholders, perhaps, but think of the immense amount of satisfaction to be derived from such a connection. All this happened in one year's time. Events move quickly in the telephone world.

After the stockholders had lost their entire investment and had paid twenty-five dollars each for the privilege, charging themselves in lieu thereof with a large amount of valuable experience, the company was reorganized under the new name, "The West-

CUMULATIVE DIVIDENDS THAT DID NOT MATERIALIZE.

ern Telephone & Telegraph Company, and started in business with a great flourish of trumpets. Certain of the stock was placed on a 6 per cent. cumulative basis, in order to effect a re-organization, and the investors sat contentedly down to wait for the dividends to cumulate.

"Now," said the promoters in effect, "we are getting down on a practical, working basis. We are starting out with a clean ledger and a large territory. This thing is going to be run right and in the interest of the stockholders."

That was two years ago, two years during which the entire country has prospered uniformly, in which Independent telephony has taken tremendous strides forward; years in which some of the more wisely managed Bell companies have done a profitable business and made a good showing. Yet, now the poor stockholder is informed that the July dividend will be passed. Not that the company is not doing well; O, dear, no. The stock is cumulating all right, but owing to certain peculiar circumstances surrounding the telephone situation in that particular territory, the dividend was not cumulating fast enough to make payment worth while.

It would be interesting to really know what are these "peculiar circumstances" surrounding the telephone situation in that particular territory. This is not the first time that a dividend has been passed on account of peculiar circumstances, which have not yet been entirely explained to the satisfaction of the stockholders. Only a few months ago a series of very peculiar circumstances took place over in Michigan, and before the stockholders of the Michigan Telephone Company could be really certain what had run over them, their stock was wiped out and the bondholders took possession of the property, very reluctantly, to be sure, and with a reasonable and proper sympathy for the unfortunates who were exchanging good, hard dollars for experience.

There are some things connected with this Western situation which recall the unfortunate Michigan affair and give rise to the question, is history to repeat itself? Will the Western go the way of the Erie, the way of the Michigan, the way that so many of the Bell ventures have been going, since Independent telephony began its resistless march across the country? Time alone can tell. Meanwhile the Independent companies can go forward along conservative lines, steering clear of all peculiar circumstances, and confident that, in the long run, wise management and good service will win. There is a great future for telephony in the West, and as a business proposition there are few things better than a properly conducted telephone business in a proper territory.



The Telephone in the Courts

Conducted by A. H. McMILLAN.



Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

LOCATION OF POLES.

THE road commissioners of a township have a right to adopt a regulation requiring telegraph lines to be erected along the property line; and the courts will construe such a regulation as meaning that the poles shall be placed on that part of the highway next to the property line in such a way that all the necessary parts of the poles shall be within the highway. So the Superior Court of Pennsylvania has held in the case of *American Telephone & Telegraph Company vs. Harborecreek Township*, 23 court further held that where the road commissioners have adopted such regulations as to the construction of the poles in the highway as the increased traffic and changed conditions require, the court will not interfere to restrain them from interfering with complainant's telephone poles situated in the public road, in the absence of evidence establishing an abuse of discretion. The adoption of such regulation of the original construction of the line did not exhaust the power of regulation possessed by the commissioners, but they might adopt and enforce such new regulations as increased traffic and changed conditions require. It was contended that the act of Congress of July 24, 1866, empowering telegraph companies to construct their lines along any post-road, had the effect of putting such companies beyond municipal control with respect to the use of such highways. But the court ruled that this contention was not well taken. *American Telegraph & Telephone Company vs. Harborecreek Township*, 23 Pa. Super Ct. 437.

RIGHT TO USE PRIVATE INSTRUMENTS.

The following communication from the Waterloo Milling Company to the Vought-Berger Company, of La Crosse, Wis., has been referred to us for answer:

We have had a pendent telephone in for some time, but the Harrisonville Telephone Company, the local company here, who have recently made connections with the Bell Company of Missouri, are raising some objections to our using this telephone, although we have a Bell instrument in the same room, for which we pay the regular rate, both telephones being connected on the same wire, but one is in use at a time. Please let us know if you have had any trouble or complaints of this nature from other parts where you have instruments in. This telephone was ordered with other goods for the city of Waterloo, by the writer (who is mayor of the city). The local company claim that under their contract with the Bell Telephone Company they have no right to use any other than a Bell instrument. Under the circumstances this seems a little arbitrary on their part, and I would thank you for any information you can give us.

THE claim of the Harrisonville Telephone Company that their contract with the Bell Telephone Company, of Missouri to use no other than Bell instruments prevents them from permitting you to use your pendent telephone is not well founded. The clause in the contract relating to that subject does not seem, from your statement, to mean that the Harrisonville Company shall not connect with any person who uses other than a Bell instrument; it seems to mean merely that they shall not use such instruments themselves. Even should it be open to such an interpretation, I do not believe it would be valid in law. It has been held in a number of cases that a contract between the patentee of a telephone and telephone companies to which it has granted a license to use the same, restricting the use thereof to certain portions of the public, is void. This has been the ruling where mandamus has been sought to compel a telephone company that is a licensee of the American Bell Telephone Company to connect with a telegraph company other than the one designated by the licensor under an agreement that the licensee should connect with such companies only as the licensor approved. *Com-*

mercial Union Teleph. Co. v. New England Teleph. & Telegr. Co., 61 Vt. 241; 15 A. S. R. 893. The basis for this ruling is the principle that telephone companies are common carriers of speech for hire, and bound to serve all persons and corporations alike, upon their tender of equal pay for equal service, and compliance with the company's reasonable rules and regulations. By analogy, in the case before us the part of the contract between the Harrisonville Telephone Company and the Bell Telephone Company, of Missouri, providing that the Harrisonville Company shall have no right to use any other than a Bell instrument is void because the natural operation of this provision of the contract, if construed to prohibit connection with any subscriber who uses any other than a Bell instrument, is to withhold facilities for the transaction of business from one class of citizens that it accords to others. *State ex rel. American Union Telegraph Co. v. Bell Teleph. Co. of Missouri*, 44 Am. Rep. 241.

Whether the Harrisonville Telephone Company itself can object to the use of the pendent telephone by the subscribers is another question. In the case of *Gardner v. Providence Telephone Company*, (Rhode Island), 49 A. 1004, it was held that a company might not forbid the use by a subscriber of a private set of extension instruments and refuse him the use of its line where the company was unprepared or neglected to furnish approved appliances of that kind or demanded exorbitant rates, the use of such set by the subscriber causing no detriment to the company either in its demand upon service or in safety. If any of these conditions exist in the present case, the subscriber is undoubtedly entitled to use his own telephone.

PROXIMATE CAUSE OF INJURY.

IN the case of the Georgetown Telephone Company vs. McCullough's administrator, recently decided by the Court of Appeals of Kentucky, defendant telephone company rented two rooms in a building one of which was used as an exchange, and the back room for storing materials. The owners of the building employed a carpenter to put up a partition next to the storeroom, in order to accomplish which it was necessary to remove the materials stored therein, and in doing so the carpenter ordered his assistant to remove a box of dynamite from the shelves. The assistant carried the box into the common hallway, and placed it in a corner near the doorway of defendant's operating room, where, from some unknown cause, it was exploded, injuring plaintiff's decedent, who was at the time in defendant's operating room in the performance of her duties as one of defendant's operators. The court held that the proximate cause of the injury was the negligence of the carpenter's assistant in placing the box where he did, and not the negligence of the company in storing the dynamite in its storeroom.

Georgetown Telephone Co. v. McCullough's Adm'r (Ky.), 80 S. W., 782.

A CASE OF CONTRIBUTORY NEGLIGENCE.

WHERE a lineman of a telephone company, of experience, aged 19 years, was killed by contact with a wire of an electric lighting company, which had been strung on the poles of the telephone company, and from which wire the insulation had worn off near the pole which he had climbed, and for several feet on each side of the pole—he knowing or being able to know by ordinary diligence that the wire was so exposed—it was held by the Supreme Court of Georgia that his mother could not recover from the electric lighting company the value of his life.

Columbus Railroad Co. v. Dorsey (Ga.), 46 S. E. 635.



IN THE OPERATING FIELD.

NEW YORK ASSOCIATION MEETING.

AT the convention of the New York State Independent telephone association which was held in Buffalo, on June 23rd and 24th, several hundred companies were represented. Prominent men interested in Independent companies in Ohio, Indiana and Michigan, were present. A full report of the convention will be given in our next issue.

The programme arranged by the secretary was as follows:

FIRST DAY'S SESSION.

Address of Welcome.
Response by President Geo. R. Fuller.
Report of Secretary.
Appointment of Committees.
Addresses by Representative Telephone Men.
Reception at Frontier Telephone Company.
Reception at Ellicott Club.

SECOND DAY'S PROGRAMME.

Inspection of Manufacturers' Exhibits.
Election of Officers.

CONVENTION PAPERS.

"Telephone Construction and Its Proper Care," W. H. Johnston, Buffalo, N. Y.
"Methods of Exchange Operating and Its Relation to the Public," F. M. Potter, Syracuse, N. Y.
"Methods of Handling Toll Business," T. S. Lane, Buffalo, N. Y.
"Methods of Exchange Accounting," Geo. R. Fuller, Rochester, N. Y.
"Telephone Conditions in Great Britain and Central Europe," M. S. Conner, Rochester, N. Y.
Report of Special Traffic Committee.
Report of other Committees.
General Discussion.
Miscellaneous Business.

THE FEDERAL COMPANY'S EXTENSIONS.

THE Federal Telephone Company is buying the rights of way and poles are now being shipped for a new toll line running from Leechburg to Vandergrift and Paulton. The completion of this line will be a still further step toward perfecting the Federal system, through Westmoreland county. Another line is being built between Greensburg and Manor and the company is laying cable at Washington, Pa., and Brownsville. The line from Latrobe to Ligonier was completed recently and is furnishing satisfactory service. For ten miles the line avoids the highway, cutting directly across the country. In order to complete this portion of the work the company was compelled to remove 543 trees from the line of the right of way.

A COMPOSITE CIRCUIT ON MAINE CENTRAL R. R.

A COMPLETE equipment has been put in operation on the Maine Central's telegraph wire between Bangor and Portland, Me., making it possible for telephone and telegraph instruments to work independently of each other on the same line at all times.

It is proposed to equip wrecking trains with composite instruments that they may be put in touch instantly with the train dispatchers upon arriving at the scene of a wreck. The circuit, as far as the telephone service goes, will be a trunk line between the offices of the superintendents in Bangor and Portland.

The line will be specially designated by having its insulators painted a red color. The two systems on one wire do not in any

way interfere with each other, conversation being carried on and telegraph messages transmitted at the same time.

OHIO INDEPENDENT TELEPHONE ASSOCIATION FEES.

THE fees for membership in the new Ohio Independent Telephone Association, which held its first meeting at Columbus recently, have been placed as follows: For all exchanges with less than 1,000 telephones and 100 miles of toll lines, \$5, and for all exchanges having more than 1,000 subscribers or 100 miles of toll lines, \$10. The association will employ expert engineers, it is stated, to improve and develop long distance lines.

SUCCESS OF THE TOLEDO COMPANY.

AT a meeting of the directors of the Toledo Home Telephone Company held recently, a most gratifying state of affairs was announced.

It appears from the report, that the cost of extensions and improvements aggregating \$150,000 has come out of the earnings, and not from sale of treasury bonds as anticipated. It was also reported that the exchange is now handling an average of 160,000 calls a day, or about 22 per telephone. Manager Hamlin was instructed to make arrangements for a grand opening and public inspection to last four or five days, during which the patrons will be given an opportunity to inspect the plant and study the *modus operandi* of the institution.

LIVERPOOL-PARIS TELEPHONE.

LIVERPOOL was for the first time placed in direct telephonic communication with Paris recently. The circuit will be via the London Telephone Exchange. The arrangements are such that, while Liverpool can speak to Paris, Calais, etc., Manchester, Leeds and other English provincial towns, respectively, will be able to converse with Paris and French towns other than those on the Liverpool list. This plan has been devised in order to connect towns in England and France which have trade interests in common.

BIG INCREASE IN SUBSCRIBERS TO CUYAHOGA.

IN a recent report of the Cuyahoga Telephone Company, Cleveland, Ohio, it is shown that this company now has 12,000 subscribers. Last month the number of new contracts secured was at the rate of over 200 a week. At the present time the number of instruments installed and contracted for is in the neighborhood of 12,600, and it is estimated that at this rate of progress there will be 16,000 telephones in operation by the first of next year. The same rate of increase is evidenced in all the other Independent companies in Ohio as well as in Illinois and Indiana.

THE CITIZENS' COMPANY WITHDRAWS.

THE Citizens' Telephone Company, of Evansville, Ind., has sent a communication to the Council asking that "it grant to the Home Telephone Company the franchise submitted the Board of Public Works by it, provided only that such conditions be imposed as will secure to the city the establishment of a telephone system under that franchise within reasonable time, and the payment at once to the city of a sum sufficiently large to secure it from loss in case of any failure to establish such plant within such reasonable time. Also that the conditions be imposed that such company shall secure connection with independent long distance lines, and also that the maximum rates for residence and business telephones are not higher than those asked

for by the Citizens' Company. Upon the granting of such a franchise with such security to the city and its citizens, this company will withdraw its application for the pending franchise. The Citizens' Company and its incorporators do not wish the franchise, if in good faith any other company offers better terms to the city."

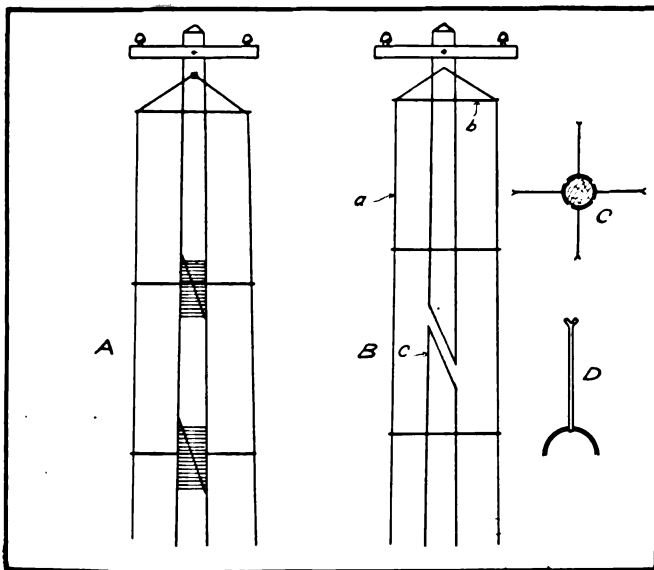
THE BELL TRIES TO ENTER CRAWFORDSVILLE, IND.

THE Central Union Telephone Company (Bell) is putting forth a facetious effort to put in a local exchange at Crawfordsville, Ind. The citizens generally and the business men particularly oppose it, and insist that there is not room for two systems in Crawfordsville. They point out dangers ahead and say that the Central Union Company has positively refused to agree to a certain stipulated rate for its telephones. The rates of the Independent company now occupying the field are fixed by ordinance at \$12 for residence and \$27 for business telephones.

A METHOD FOR MAKING LONG POLES.

IN building country lines it often happens that the route of the wire crosses a hollow necessitating the use of a high pole.

As it may be impossible to secure one without a very great deal of expense and loss of time, the writer suggests the following method of splicing two or three poles together, which makes a very strong pole and, at the same time, is not expensive. Referring to the figure, it will be noticed that the ends to be spliced together are shaped as at *c*. They are then tightly bound with



wire. At the top of the pole a bolt is driven through and to this four steel wires *a*, are attached which are separated by means of spreaders, as shown in Fig. *c*. Fig. *d* illustrates the sort of spreader to use. These wires should be brought down to the base of the pole and fastened in a similar manner to that employed at the top. When well done the pole will be as staunch as if it was made of a single piece of wood. The Fig. *A* illustrates the use of three poles to secure one long one. The tension wires should be grounded so as to prevent injury from lightning.

POLICE TELEPHONE SYSTEM IN NEW YORK.

THE present police telephone system in Manhattan covers twenty-nine precincts. There are 661 telephone stations in all, each precinct having from twenty to thirty stations. The stations of a single precinct concentrate at a switchboard in the local station house. From there to Mulberry street headquarters there has been private telephonic service for many years. The large switchboard at headquarters thus minutely covers the entire old city of New York, and by extending ramifications reaches the general telephonic service of the city, headquarters here and in Queens and Richmond, as well as the Police Department stables, the Fire Department and the hospitals.

The city supplies the operators, the New York Telephone Company maintains the system. In this way a decided advantage is gained. The city pays an annual rental for the use of the ap-

paratus and gains all the resources of modern appliances, a great interchange of exchanges and the resources of an expert engineering staff. The employment of a corps of skilled men to maintain the new service is thus obviated.

EMPLOYEES OF KANSAS CITY HOME COMPANY PRESENT GIFT TO CHIEF OPERATOR.

A MOST pleasant surprise was given Mrs. Brown, the chief operator of the Kansas City Home Telephone Company, by the employees of the operating department in the presentation to her, by them, of a handsome diamond ring on the occasion of her birthday, June 17th.

Mrs. Brown's popularity is of the kind which never wears out and the longer one is acquainted with her, the more thorough is her knowledge of the business apparent. Mrs. Brown's experience has been very diversified, having held the position of instructress for a construction company for a number of years. In this way she has come in contact with all classes of operators, and the Kansas City Home Company is to be congratulated upon securing the services of one so well posted in the methods and conditions necessary for the successful operation of a large switchboard.

CENTRAL UNION DEFIES LAW.

K. BOUGHTON, a foreman in charge of a set of men employed by the Central Union Telephone Company, at Shelbyville, Ind., placed a telephone pole on the corner of Miller and Mechanic streets, in a place and in a manner as to violate an ordinance, and render the pole a nuisance. Boughton was arrested, charged with a misdemeanor, and fined \$5.00 and costs. He appealed to the Circuit Court. The next day the local manager of the telephone company was arrested and fined an equal sum for allowing the pole to remain for a day—the ordinance providing for a fine for each day said pole was allowed to remain in the prohibited spot.

AN INDEPENDENT COMPANY FOR COUNCIL BLUFFS.

THE organization of an Independent telephone company for Council Bluffs, Ia., is now assured. A new corporation is to be formed, composed of local business men, together with a few parties interested in Independent exchanges elsewhere. The new company will connect with other Independent exchanges in southwestern Iowa, and will also serve trunk facilities to the principal cities in Wisconsin and Illinois.

THE TELEPHONE AIDS IN CAPTURE OF CRIMINALS.

THE rural telephones in the neighborhood of Leavenworth, Kan., are being used to advantage by the officials in charge of the penitentiary at Lansing, and they are proving to be the best of convict catchers. In case of the escape of a prisoner the different rural lines are called up and a description sent out before the convict has an opportunity of changing his appearance, and as there is a standing reward for captures, the farmers at once get out their guns and go hunting. The last three convicts who escaped from the Kansas penitentiary were captured by the use of the telephone. On June 9th a trusty tried to make his escape, and before he was missed from the grounds a farmer telephoned in a description of him, and asked if he was missing. Upon investigation the farmer was notified, and at once went hunting for the prisoner, and soon brought him in.

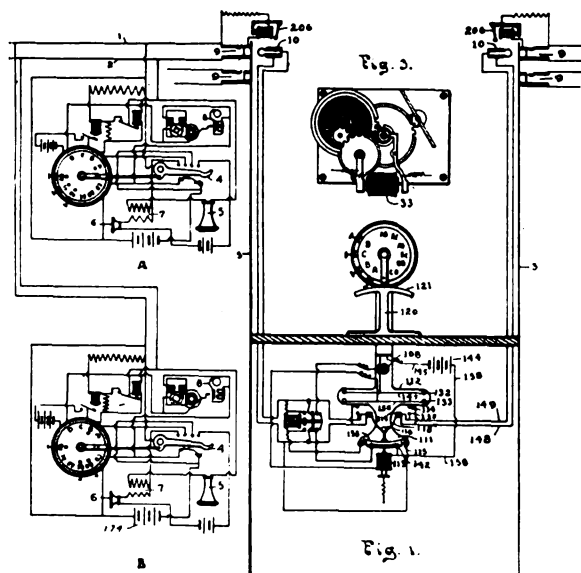
TELEPHONE TAXATION IN INDIANA.

THE Indiana State Tax Board meets July 9 and will continue in session for six weeks. Every year the board fixes the assessment for telephone companies and when through it has a report from every company in the State showing what property it possesses, miles of wire and kind, how long in use, number of poles, kind, height and age, number of instruments, kind of and how long used, etc., amount expended during the year for material, wages and salaries, the gross and net incomes, etc. Other States are making inquiry relative to the working of the Indiana tax law regarding the plan of assessing telephone property.



SELECTIVE PARTY LINE SYSTEM.

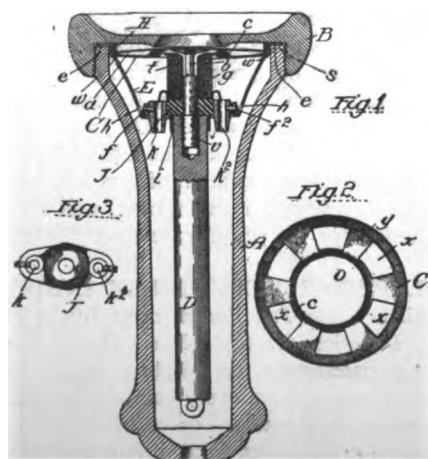
A. J. Springborn, Cleveland, Ohio, patents (No. 761,616) an improved party line selective system, the essential features of which are shown in the accompanying illustration. Fig. 1 is a diagrammatic view of a party line equipped with this device. At the central office the jacks are represented by 9, the plugs by 10, and the annunciators, or signals, by 206. The essential



features of the invention consist in providing a dial at each substation supplied with a hand which is driven by clock-work, as shown in Fig. 3. The clock-work is controlled by an electromagnet 33, and a series of contacts are provided over which the hand travels, and in so doing operates contact fingers that cut in or out of circuit the various stations attached to the line, thus by setting the hand on the dial at the proper station, the subscriber is enabled to selectively signal.

TELEPHONE RECEIVER.

Ernest Gundlach, of Berwyn, Ill., patents (No. 762,820) an improved telephone receiver and assigns to the American Telephone & Telegraph Company. This invention is shown in the accompanying illustration. Its essential feature consists in providing a spring diaphragm, *c*, which is arranged to press against the sound



diaphragm, *a*, in such a manner as to produce tension in the center of the diaphragm. In this receiver, *D*, is the permanent magnet, which is counter-bored at its forward end. Around the permanent magnet the ordinary receiver coil, *g*, is placed. In the

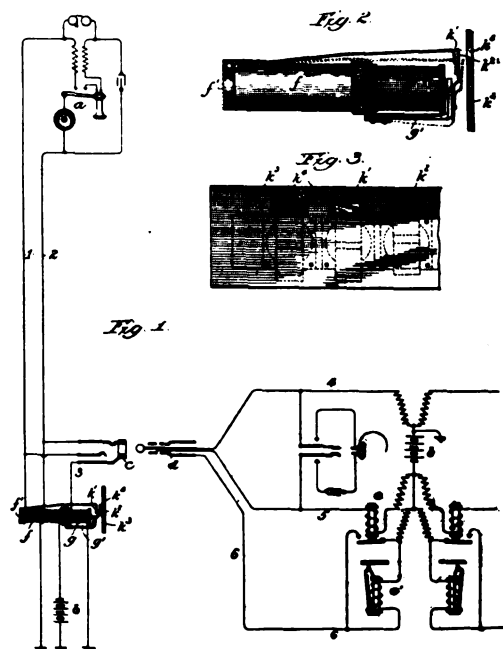
counter bore is a piece of loosely fitted soft iron, *b*, which is attached to the center of the diaphragm. This construction, in conjunction with the tension spring previously described, comprises the novelty of this invention.

SIGNALLING APPARATUS.

E. A. Faller, New York, patents (No. 762,695), an improved signalling apparatus and assigns to the Faller Automatic Telephone Exchange Company. The object of this invention is to provide a means to send a number of predetermined signals by the simple act of pressing the proper key or button, and is accomplished by the simple manual operation of pressing the proper key or button into a new position. The apparatus is intricate, requiring three sheets of drawings for its exhibition. Those interested in this type of signalling would do well to procure the original patent.

SWITCHBOARD SIGNAL.

Messrs. McBerty and McQuarrie patent (No. 762,337) and assign to the Western Electric Company an improved form of switchboard signal, and this device is shown in the accompanying illustration, in which Fig. 1 shows the circuit, while Figs. 2 and 3 are details of the signal. It consists of two electric magnets, *f* and *g*. The armature, *f'*, of the magnet, *f*, carries a target, *k*, which in its normal position is below a hole



in plate *k*₃. When the magnet, *f*, is excited the armature, *f'*, is attracted and the target, *k'* rises in front of the opening, *k*₄. The magnet, *g*, is provided with an armature which carries a shield, *k*₂, which is painted the same color as *k*₃. When *g* is excited the armature, *g'*, rises and takes its place in front of the target, *k'*, thus apparently restoring the signal. The method of connecting this signal in a switchboard circuit is shown in Fig. 1.

SELECTIVE SIGNAL.

E. W. E. Thompson, of Brookline, Mass., patents (No. 762,364) an improved selective signal apparatus. This invention belongs to that class of mechanisms which signal with step by step apparatus and does not differ materially from many which have previously appeared. The invention provides, at each substation, a rotating wheel containing as many pins as there are stations. An electromagnet is arranged to rotate each wheel, one pin for every impulse transmitted through the line and thus any station may be selective.



QUERIES

Questions on any subject relating to telephony will be answered on this page.



56 AND 71 SETS.—(358.)

Will you please explain the difference between the talking circuits of a 56 and 71 set used by the Bell companies, as shown in the following sketch?

E. E. B.

In Fig. 358 *A* represents a 71 set and *B* a 56 set. The bell circuit is placed between the junction point of the condenser with the secondary circuit going to the binding post 2. In the 56 set the secondary circuit is a closed loop consisting of the condenser, transmitter, and secondary winding of the induction coil. The primary circuit consists of a transmitter, the primary winding of the induction coil, receiver, line, and central office equipment. The 71 set differs in the fact that the receiver is closed in the secondary circuit as shown at *A*. From the point of transmission the 71 set is slightly better than the 56 set, but in hearing qualities

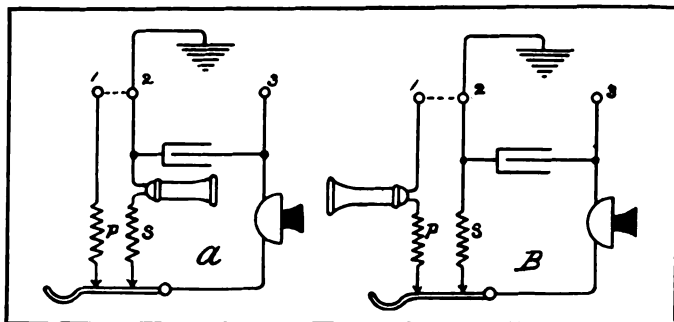


Fig. 358.

the 56 set is, if anything, better than the 71. The reason for that is this: In the 56 set the transmitter is in parallel with the condenser and secondary winding of the induction coil, consequently in listening, the total variation in current is effective directly through the primary winding and the receiver, whereas in the 71 set the receiver being in series with the secondary winding and condenser is partially shunted by the transmitter. The resistance of receivers used in the 56 set is about 60 ohms, while the one used in the 71 set is in the neighborhood of 80. The reason for the difference is that in the case of the 56 set it is advisable to cut down the resistance of the line as much as possible, whereas in the 71 set the absence of the receiver from the primary circuit effects the same result.

ELECTROSTATIC CAPACITY.—(359.)

Does iron wire, size for size, have the same electrostatic capacity as copper? Does No. 8 wire have a greater electrostatic capacity than No. 14?

A. K.

Electrostatic capacity depends upon the size of the conductors, upon the distance between them, upon their shape and upon the specific inductive capacity of the dielectric which separates them. Therefore, two wires of the same size and separated by the same distance by the same dielectric would have the same capacity, consequently, No. 8 wire would have either an equal, greater, or less capacity than a No. 14, depending upon the distance between them and the nature of the dielectric.

NOISY LINE.—(360.)

We have a metallic line twenty-five miles long entering a city where there is a great deal of induction from electric light plants, trolley cars, etc. The line works well, but at times it becomes very noisy—a grating noise is heard, similar to battery noises, almost strong enough to ring the bell or throw the drop. Do you think this could be a loose connection near the electric light wires, or anywhere along the line which would produce this noise? No. 12 iron wire is used, and some of the joints have never been soldered. I cannot imagine what causes the grating noises.

C. E. A.

In reply to your query we would suggest that you have all the joints on your line gone over and well soldered. In all probability the noise is caused by the induction from the electric light

to moisture, as you know, rusts very readily, and even if it is well galvanized the joint may not be tight enough, and consequently the action of wind causes a constant friction which will quickly wear away the zinc coating. As soon as this occurs the iron surface is exposed to the oxidizing effects of the atmosphere and commences to rust. This rust increases the resistance of the joint tremendously, and, at the same time, on account of wearing away the surface of the wire, tends to loosen the joint. In soldering the joints we would suggest the following method: Cut out the old joint, thoroughly clean the wires so that they are bright and then apply a flux of muriatic acid lightly and pour over it hot solder until the joint will be perfect.

The probable cause of the noise is the varying resistance of the line due to these poor joints, and in which case the inductive effects due to the electric light and trolley plants are aggravated. It would be best to measure the strength of the current which is apparent by means of a voltmeter, for if, as you say, it is nearly strong enough to ring a bell or throw the drop, there is a possibility of a cross with some foreign electrical source. This cross could occur on poles, or even on insulators, if they have become very dirty. Do you transpose your lines? If not it should be done as soon as possible, as this is the only method of destroying inductive effects due to foreign disturbances.

ERICSSON TRANSMITTER.—(361.)

Will you please illustrate the construction of an Ericsson transmitter?

K. L. S.

By referring to the diagram, Fig. 361, the general idea of construction will be seen. The particular points of notice are the copper spring which presses against the felt ring which acts as a retaining wall for the carbon; also to the little piece of felt

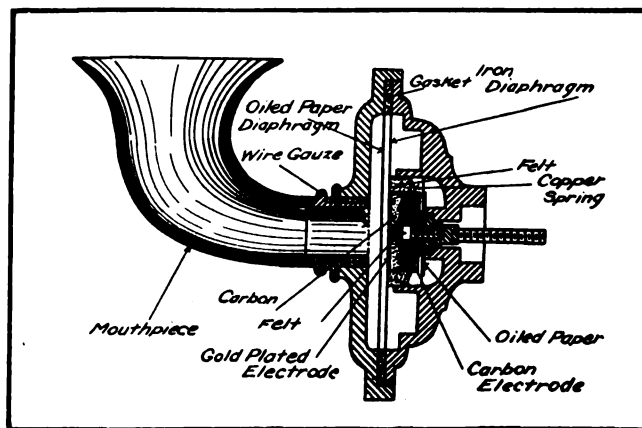


Fig. 361.

which is placed in the hole containing the binding screw which fastens the carbon electrode to the frame of the transmitter. The front electrode is gold plated and has a pebbled surface. The object of the oiled paper diaphragm is to prevent moisture entering within the case, and so affecting the variable resistance of the carbon.

RELAY OPERATION.—(362.)

Will you please show me how to calculate the voltage necessary to operate a 500 ohm and a 100 ohm relay?

C. S.

From the information you have given us, it is impossible to give you the method of calculating the voltage necessary to operate the specified relays. The operation of a relay depends upon several conditions, such as the resistance, the number of ampere turns, the adjustment of the relay, that is, the distance through which the armature has to move, and also whether the current passes through any other resistance before it reaches the relay.



THE WEEK'S MESSAGES

FINANCIAL.

FREDERICKTON, N. B., CAN.—Letters patent have been issued increasing the capital stock of the Central Telephone Company, Limited, Frederickton, N. B., from \$10,000 to \$209,000, and extending the powers of the company to the whole province.

DAHLGREN, ILL.—The Dahlgren People's Telephone Company has increased its capital stock from \$5,000 to \$10,000.

BURLINGTON, IA.—The name of the Burlington & Augusta Telephone Company has been changed to the Burlington Rural Telephone Company, and the capital stock has been increased to \$25,000.

SHAKOPEE, MINN.—The Shakopee Telephone Company has increased its capital stock from \$3,000 to \$10,000.

ROCKFORD, O.—The Rockford Toll Line Telephone Company has increased its capital stock from \$10,000 to \$20,000.

WELLSTON, O.—The Wellston, Mineral and Athens Telephone Company has increased its capital stock from \$2,000 to \$10,000.

WESTMINSTER, O.—The United Farmers Telephone Company has increased its capital stock from \$10,000 to \$20,000. R. A. Kerr is president of the company.

Youngstown, O.—The financial report of the Youngstown, Telephone Company for the month of May is as follows: Gross earnings, \$4,291; operating expenses, \$2,272; net earnings, \$2,018; deductions, \$1,297; surplus, \$721.

CENTER MORELAND, PA.—The Center Moreland Telephone Company has increased its capital stock from \$3,000 to \$15,000.

PITTSBURG, PA.—The stockholders of the Cambria County Telephone & Telegraph Company will meet at Cresson, June 27, to consider the question of issuing \$10,000 worth of preferred stock. The company has plans for improvements which include the extension of its lines, and the money from the sale of the new stock is wanted for that purpose.

MANSFIELD, TEX.—The Mansfield Telephone Company has increased its capital stock from \$4,000 to \$5,000.

MADISON, WIS.—The Westbury Telephone Company has increased its capital stock to \$10,000.

FRANCHISES.

MACOMB, ILL.—Messrs. Whitman et al. have been granted a local franchise.

QUINCY, ILL.—The Quincy Telephone Company and the Pike and Adams County Telephone Company have petitioned the city council for a franchise.

FLORA, IND.—A franchise has been granted to the Flora and Bringhurst Co-Operative Telephone Company.

LIBERTY, IND.—The Brownsville Co-Operative Telephone Company has been granted a franchise by the city council to extend its lines from Brownsville into the limits of Liberty.

LAWRENCE, KANS.—The Lawrence City Council has granted a telephone franchise to an Independent company.

SPRING HILL, KANS.—The Johnson-Miami County Telephone Company, of Spring Hill, has secured a franchise at Stillwell and will install an exchange there in the near future.

OLD TOWN, ME.—The Automatic Telephone Company has asked the city council for a franchise.

TAUNTON, MASS.—The Taunton Telephone Company has been granted a franchise to construct a system in this town.

DELANO, MINN.—The city council has granted a franchise to the Tri-State Telephone and Telegraph Company.

BOONEVILLE, MISS.—A franchise has been granted to a company organized by local business men to construct an Independent telephone system.

SENECA, MO.—The Seneca Telephone Company has applied to the city for an extension of its franchise for twenty years.

CANASTOTA, N. Y.—The board of trustees unanimously voted to grant a franchise to the Farmers' Telephone Company to construct and operate its system in this city.

CANTON, N. Y.—The borough council has granted a franchise to the Mutual Telephone Company.

FISHKILL LANDING, N. Y.—The State Line Telephone Company, with offices at 150 Broadway, New York City, have asked the board of trustees of Fishkill Landing and Matteawan for local franchises.

NORTHWOOD, N. D.—S. H. Hagan, representing the Red River Valley Telephone Company, of this place, is seeking a franchise for his company from the Mayville city council.

CINCINNATI, O.—The Queen City Telephone Company has made application to the Hartwell city council for a franchise to construct a system in that city.

MIDDLETOWN, O.—The Middletown city council has granted a franchise to the Home Telephone Company, of Dayton. All wires in the fire limits are to be put underground.

CANTON, S. D.—Attorney Carlson, representing the Mutual Telephone Company, appeared before the city council and asked for a local franchise.

ELECTIONS.

ST. MARTIN'S, N. B., CAN.—At the annual meeting of the St. Martin's Telephone Company, held at St. John, N. B., recently, the election of officers took place as follows: C. M. Bostwick, president; C. D. Trueman, vice-president; A. W. McMackin, secretary; W. H. Skillen, W. H. Jarvis, and A. A. Stockton, directors.

FAIRFIELD, IA.—At a meeting of the Jefferson County Telephone Com-

pany, the following officers were elected: J. C. Thorne, president; Ed. Hunt, vice-president; E. S. Simons, secretary, and Frank Light, treasurer. E. A. Howard, V. A. Lawson, R. C. Sayers, with the president and secretary, constitute the board of directors. F. H. McQuister is manager, and W. D. Shirk, superintendent of the rural lines.

IRON MOUNTAIN, MICH.—The Menominee Range Telephone Company, at a meeting held here, elected Elwin F. Brown, president; Samuel Perkins, vice-president; Richard O. Browning, secretary; William Sundstrom, treasurer; Emil A. Croll, general manager. A dividend of 7 per cent. was declared. The question of extensions of the system was discussed.

CANTON, MO.—The Lewis County Telephone Company, at a meeting held recently, increased the number of directors from six to nine, and elected the following officers: F. L. Marchand, president; O. C. Clay, vice-

COLE CAMP, MO.—The Benton County Telephone Company, at a meeting held here, elected the following officers: W. H. Gallagher, of Warsaw, president; M. D. Moore, of Cole Camp, vice-president; J. H. Savage, of Warsaw, secretary and manager; W. J. Huse, of Warsaw, treasurer. The company has received material to extend its line from Mora to Lake Creek, president; C. M. Bradshaw, secretary, and W. B. Henton, treasurer.

AINSWORTH, NEB.—The Keya-Paha and Brown County Telephone Company, with headquarters in this city, has elected the following officers: William Stonicker, president; William Davison, vice-president; F. A. Baldwin, treasurer; W. H. Williams, secretary, and J. M. Hanna, R. E. Jones and F. L. Brewster, directors. The company voted to run a double line to connect points, to be commenced at once.

GLOVERSVILLE, N. Y.—At a recent meeting of the Glenn Telephone Company, the following officers were elected: P. F. Cole, president; Steven R. Jennings, vice-president; Delos Van Woert, secretary and treasurer.

CLEARFIELD, PA.—The Huntington and Clearfield Telephone Company has elected the following officers: Ellis L. Orvis, of Bellefonte, president; A. W. Lee, of Clearfield, vice-president; G. H. Lichenthaler, of Phillipsburg, secretary and treasurer; W. L. Halin, of Clearfield, general manager. James Kerr, A. E. Patton, W. D. Barnard, F. G. Harris, Allison O. Smith, Rembrandt Peals, Thomas J. Lee, W. H. Denlinger, directors.

RURAL VALLEY, PA.—The Cowanshannock Telephone Company, at a meeting held here, elected the following officers: Dr. A. J. Kelly, of Whitesbury, president; W. T. Burns, of Brainerds, vice-president; O. S. Marshall, of Rural Valley, secretary and treasurer.

THOMPSON, PA.—The Northeastern Pennsylvania Telephone Company, at a meeting held here, elected the following officers: M. D. Daniels, of Uniondale, chairman; F. I. Gelder, of Forest City, secretary; J. E. Tiffany, treasurer.

COMBINATIONS.

GREENVILLE, ALA.—J. H. Riviere and Company have purchased the Greenville Telephone Exchange from W. N. Cannon. The new owners propose to make several improvements in the exchange.

GRAVETTE, ARK.—The Potter Telephone Company, of this place, has purchased the Southwest Missouri line running from Sulphur Springs to Noel, and is connected also with Bentonville.

CHANT, IND. TER.—T. L. Hearn has purchased the local exchange of the R. B. Telephone Company.

CUSHING, IA.—The telephone system at this place has been transferred to the management of W. F. Hutton. Mr. Hutton will connect the lines to his rural lines.

SUMNER, IA.—The attached lines, exchanges and other property of the Sumner Telephone Company have been sold at auction to Fred Pleggenhuhle, secretary of the company, for \$7,100.

GARNETT, KANS.—The Garnett Telephone Company has sold its toll lines between Lone Elm and Kincaid to the Eastern Kansas Telephone Company, of Kincaid.

LONDON, KY.—The London Telephone Company and the Manchester Telephone Company have consolidated, with a capital stock of \$15,000.

HILLSBORO, N. D.—The Traill County Telephone Company has purchased the Hillsboro, Duane, Caledonia and Shelby telephone system.

PRAIRIE DU CHIEN, WIS.—The Star Telephone Company recently organized, has purchased the property of the Crawford County Telephone Company.

PERSONAL.

J. S. BENTON has resigned the position of manager of the Salix Telephone Company, of Somerset County, Pa., and has been succeeded by L. D. Shaffer.

C. C. CONROY, of Beaumont, Tex., who recently effected a merger of his Beaumont and Northwestern Telephone Company with the Lone Star and Commercial companies, has gone to Chicago to purchase an interlocking party-line device and other improvements.

H. I. CRAWFORD has been appointed manager of the independent telephone exchange at Warsaw, Wis., to take the place of P. Hirsch, who takes up other business for the same company.

S. H. FRANKFORD has resigned the position of manager of the Rawson Telephone Company. He is succeeded by Mr. Harkness.

W. C. MAAS has been appointed district manager at Waco, Tex., for the Southwestern Telephone and Telegraph Company.

F. W. PARDEE has recently been appointed general manager of the F. B. Cook Company. Mr. Pardee is a man well fitted for this position, having gone through a four years' technical course in electricity and has been the advertising manager for a western trade paper. Recently he was general sales agent for the Chicago Writing Machine Company, later having charge of the telephone department as corresponding secretary, which position he resigned to take up his new duties.

J. R. POWER has been appointed assistant manager of the Maysville, Ky., telephone exchange.

OBITUARY

MRS. C. JUDSON, wife of Clarence Judson, the well-known telephone manager, died at her home in Council Bluffs, Ia., on June 14th, after a lingering illness.

UNDERGROUND.

FORT DODGE, IA.—The Fort Dodge Telephone Company will put in an underground system at once. It will also construct several more rural lines and extend its system generally to take care of its growing business.

OTTUMWA, IA.—The city council has given consent to the Iowa Telephone Company to lay an underground conduit system in the fire limits of the city.

NORTH ATTLEBORO, MASS.—The Providence Telephone Company has asked the board of selectmen for permission to construct an underground conduit system through the center of the town for its wires.

KNOXVILLE, TENN.—The People's Telephone Company is putting in underground cables in the business part of the city, and has also built a line into Rockwood.

NEW COMPANY NOTES

BIRMINGHAM, ALA.—The Standard Telephone and Telegraph Company has been incorporated, with a capital of \$25,000. The incorporators are C. Henderson, W. C. Cameron and L. Enzer.

GILLET, ARK.—The People's Union Telephone Company, capital stock \$25,000, has been chartered to do business here. Officers: William J. Stillwell, president; J. H. Martin, vice-president; M. C. Hollis, secretary; G. F. Mattniller, treasurer.

JONESBORO, ARK.—The Automatic Home Telephone Company, of Jonesboro, capital stock \$25,000, has been chartered here. The directors are: R. L. Collins, president; F. C. Watts, vice-president; A. C. Gambill, secretary; R. L. Jones, treasurer; S. A. Daniels and H. E. Schneck.

QUINCY, ILL.—The German Telephone Company has been incorporated, with a capital of \$500. The directors are A. Bartell, M. Gronewald, D. G. Buss and others.

REDDICK, ILL.—The Reddick Mutual Telephone Company has been incorporated, with a capital of \$5,000, to give telephone service to the towns of Reddick, Buckingham, Union Hill, Essex, Colberry, Wilson and Pompies. Exchanges will be installed at Union Hill, Buckingham, Wilson and Reddick. The officers are H. G. Kenuckholm, president; J. Reilly, secretary, and S. Corcoran, treasurer.

UPPER ALTON, ILL.—The Petersburg & Upper Alton Main Line Telephone Company has been incorporated here, with a capital of \$2,500, by J. S. Culp, A. A. Penning and W. M. Cartwright.

INDIANAPOLIS, IND.—The Stamps Creek & Orlenas Telephone Company has been incorporated here, with a capital of \$200. The incorporators are H. McCoy, S. Cornwall and B. F. Williams.

GOODWATER, I. T.—The Goodwater Telephone Company has been chartered here. W. Whitmore, president; B. S. Harris, vice-president, and W. H. McBrayer, secretary and treasurer.

CASEY, IA.—The Casey Mutual Telephone Company has been incorporated here with a capital of \$1,500. The officers are A. M. Fagan, president; C. L. Knox, vice-president; C. C. Jones, secretary and manager; S. L. Rutt, treasurer. Telephone service is given to the town of Casey, where there are in the neighborhood of 300 subscribers.

PATON, IA.—The Paton Mutual Telephone Company has been incorporated with a capital of \$10,000. To give telephone service to the town of Paton. The officers are: J. S. Williams, president; W. H. Fallon, vice-president; K. C. Latta, secretary, W. H. Fowler, treasurer, and H. H. Waldron, manager.

JUNCTION CITY, KY.—The Junction City Telephone Company, capital \$5,000, has been incorporated by J. R. Steele, B. W. Durham and H. S. Chase, of Boyle.

MADISONVILLE, KY.—The Rural Telephone Company has been incorporated by W. N. and W. B. Bailey and M. F. Allen, to build numerous lines in this county and extend to Muhlenberg.

WOODSTOCK, KY.—The Woodstock Telephone Company has been chartered to do business here.

BOONEVILLE, MISS.—A company has been organized to establish a telephone system here.

FORRESTVILLE, N. Y.—The Coneswango Valley Home Telephone Company has been incorporated by A. H. Libby, Forrestville; E. B. Crissey, Jamestown; B. C. Wilson, South Dayton. The capital stock is \$11,000.

NEWARK VALLEY, N. Y.—The Northern Tioga Telephone Company has been incorporated here with a capital of \$10,000. The incorporators are G. E. Purple, F. W. Witter and H. L. Knapp, of Newark Valley.

BAINBRIDGE, OHIO.—The Bainbridge Telephone Company has been incorporated with a capital of \$10,000, to give telephone service in this vicinity. The incorporators are W. Howard, C. R. Post, A. B. Chamberlain, S. A. McFarland, C. S. Linhart and O. J. Post.

COLUMBUS, OHIO.—The Morral Telephone Company has been incorporated here with a capital of \$10,000. The incorporators are J. A. Baer, S. C. Baker, G. E. Morral, W. G. Lupton and W. H. De Roche.

CHARLESTON, S. C.—The Coast Line Telephone Company, capital \$15,000, has been chartered to conduct a system of telephones on the coast islands. The incorporators are: C. B. Jenkins, F. W. Towls and Julian Mitchell, Jr.

NASHVILLE, TENN.—The Bass Bridge Telephone Company has been incorporated here with a capital of \$300.

SCHULENBURG, TEX.—The Schulenburg Telephone Company, capital \$5,000, has been chartered to maintain telephone lines in Fayette, Lavaca, Gonzales and Colorado counties. Incorporators: W. E. Perlitz, Charles A. Perlitz and John Schumacher.

MISCELLANEOUS.

SPRINGFIELD, ILL.—The Interstate Telephone Company has issued its new directory, which shows a large increase in the number of subscribers over those included in the previous one.

FT. WAYNE, IND.—The National Telephone and Telegraph Company has reconstructed its entire plant. Its business is increasing rapidly, having now over 3,000 subscribers.

EVANSVILLE, IND.—The telephone system being installed by the Illinois Central Railway at Evansville and vicinity is attracting considerable attention. The system connects all the offices and stations used by the company in the city and vicinity, including Henderson, Ky.

SUMNER, IA.—The Sumner Telephone Company, incorporated January 1, 1904, adopted resolutions to terminate its corporate period on June 1, 1904.

OTTAWA, KANS.—The Ottawa Telephone Company lost about seventy-five telephones in the recent flood.

HAMMONDSPORT, N. Y.—The several rural telephone lines centering in Hammondsport have formed an association known as the Hammondsport Rural Telephone Association. The following officers have been elected: Robert Sherer, president; Maurice A. Hoyt, manager; J. E. Little, Oakley Wixom, L. Wortman, Harry Niver, Fred Ovenshire, Henry Emerson, board of directors.

CINCINNATI, OHIO.—The directors of the Queen City Telephone Company met and authorized a committee to secure engineers and plat the downtown underground district at once. The president and secretary were instructed to execute a bond for \$100,000 to indemnify the city for possible damages to streets.

BLOOMSBURG, PA.—The United Telephone Companies' lines in Bloomsburg and Catawissa were badly damaged by lightning last week.

WALHALLA, S. C.—The Ocona Telephone Company's directory shows a steady growth in the number of subscribers. This company operates four exchanges and has toll connection with thirty-two exchanges in South Carolina and Georgia.

CHARLESTON, W. VA.—The Imperial Construction Company has been chartered to build and operate telephone, telegraph and electric light plants. Capital stock \$5,000. Incorporators: Homer P. Dixon, Edward P. Lawlor, James E. Ferguson, Morris Ferguson and Harlan W. Gillis, all of Charleston, W. Va.

CONSTRUCTION.

PHOENIX, ARIZ.—The Phoenix Independent Telephone Company, of which H. M. Joy, of Los Angeles, Cal., is manager, is soliciting for subscribers here. It is proposed to operate under a franchise held under the name of Jerry Millay, of Phoenix. The promoters are preparing to spend \$50,000 on the plant and to connect with several independent systems in the vicinity.

DENVER, COLO.—The Colorado Midland Railroad will equip its freight and passenger trains with telephones, that will connect the circuits alongside the track running to the superintendents' offices of the different divisions.

WAGGONER, ILL.—The People's Mutual Telephone Company, of Hillsboro., Ill., is putting in a telephone exchange and toll line wires in this village.

FORT WAYNE, IND.—The committee on improvements of the National Telephone Company, of Fort Wayne, consisting of William L. Moellering, secretary, and W. A. Rohm, treasurer, have been investigating the company's property in Michigan and have arranged with Mr. Himebaugh for extending the State line copper circuit from Burr Oak to Athens to connect with Grand Rapids. In the Sturgis, Mich., exchange an additional 100-drop extension has been made to the switchboard. Several farmer lines are connected with twenty-five or thirty telephones, and orders are on hand for twelve new city telephones.

LOGANSPOUT, IND.—The Home Telephone Company has been petitioned by citizens of Lucerne to construct a line to that place and install a system.

PORTLAND, IND.—On account of the unusual demand for telephones, the Home Telephone Company will install about 15,000 feet of cable and make other improvements and extensions.

WEST LEBANON, IND.—A new telephone exchange will be built here in the near future by the same party that owns the exchange at Marshfield.

BONAPARTE, IA.—The Farmers' Telephone Company, which was recently granted a franchise here, will install a switchboard.

CEDAR RAPIDS, IA.—Moore and Brinner, of Cedar Rapids, are negotiating for the construction of a telephone exchange at Bronson.

ELKHORN, IA.—The Marne & Elk Horn Telephone Company has decided to purchase 100 additional telephones. Its contract for wiring from Elk Horn to Exira, Brayton, Kimballton, Jacksonville and Walnut was let to Lawrence W. Hansen. Albert Peterson was given the contract to install new telephones at Jacksonville. The company will connect with the Shelby County Mutual Company.

KELLERTON, IA.—The Kellerton Telephone Company will build a line to Mount Ayr.

MARSHALLTOWN, IA.—The Green County Farmers' Telephone Company has completed its new toll line to Farlin and Churdan. It has also built a new line to Jackson and is extending its system from Hardin into Dana.

WEBSTER CITY, IA.—The Martin Telephone Company has ordered two new sections for its switchboard.

HARRIS, KAS.—The Harris Telephone Company will extend its system into the surrounding country. It will have three exchanges in operation by July 1st.

IOLA, KAS.—The Iola Telephone Company will spend \$4,000 improving its service, including one and one-half miles of cables and copper metallic wires.

LOUISBURG, KAS.—The Farmers' Mutual Telephone Company, of Louisburg, has eight rural lines started and will install an exchange at Louisburg in the near future.

MOUND CITY, KAS.—The Mound City Telephone Company will begin constructing its system at once. Forty-foot poles will be used, so as to provide for future growth. This company has seventy-five subscribers to begin with and expects to have many more by the time it is ready for business.

VINLAND, KAS.—The Farmers' Telephone Company will install a switchboard here to connect with its lines in the surrounding country.

WAVERLEY, KAS.—The Waverley Telephone Company has doubled its business within the past eight months. It will install a new switchboard.

BETHEL, ME.—The Androscoggin Lakes Telephone Company has sold stock necessary for the construction of a line from Bethel to Lakeside, N. H. ADRIAN, MICH.—The Adrian Telephone Company is building a copper trunk circuit to Morenci. When completed it will give that town connections with the principal cities in this State.

JIMINEZ, STATE OF CHIHUAHUA, MEXICO.—Weisel & Koch, of Parral, will install a telephone system here.

CLEVELAND, MINN.—The Cannon Valley Telephone Company is arranging for the construction of a line from Prior to Chanhassen.

EDGERTON, MINN.—The Enterprise Telephone Company is rapidly extending its system. Connections have been secured with the Midland Telephone Company at Lismore and Magnolia. Connections have also been made with the Interstate lines, including the Citizens' exchange at Sioux City.

KIMBALL, MINN.—The patrons of the Independent telephone line from Kimball to Main Prairie are anxious to have telephone connection with St. Cloud. The line will probably be extended by way of Luxenberg.

TRADE NOTES

THE EMPIRE ELECTRIC SUPPLY COMPANY, of 55 West Jackson Boulevard, Chicago, Ill., is now placing upon the market its new type No. 15 bi-polar receiver. This receiver has many points of merit and any one interested would do well to write for further information.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, has issued a folder which draws the attention of the trade to the high grade of apparatus it manufactures. The policy of the company is outlined, which shows that the desire on the part of the manufacturers is to attain perfection in all the details of the business.

WILLIAM ROCHE, formerly of 42 Vesey street, New York, has moved to 52-54 Park Place, where he occupies one entire floor in the manufacture of the "New Standard" dry cell and other electrical appliances. In Mr. Roche's advertisement in this week's issue of our paper will be found an attractive proposition, of interest to all telephone people.

FRANK B. COOK, of 238 N. Lake street, Chicago, has recently secured an order from the Attica Telephone Company of Attica, Ind., for his type "L" iron frame distributing rack, to be equipped with his No. 444 protectors, having the self-soldering heat-coil. The distributing frame is equipped for 600 pairs. The telephone company has recently discarded its old protective system.

MATHIAS KLEIN & SONS, of 87-89 West Van Buren street, Chicago, Ill., wish to draw the attention of the telephone trade to the fact that all their tools are stamped "M. Klein and Sons." This is necessary, since they have recently had returned to them two pairs of defective climbers which were merely stamped "Klein." Tools so marked are not of their manufacture, so that when purchasing any tools supposed to be made by this firm, be sure that the stamp is in full.

THE S. H. COUCH COMPANY, of Boston, Mass. has recently closed several large orders for their No. 30 transmitter. One large exchange selected this type after a rigid inspection of many leading makes. The company takes a just pride in the success of this transmitter, considering that from the first one put out to the present time there has never been a change made in its construction. This transmitter is shown in Price List B, which will be gladly mailed to anyone requesting it.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY will be represented at the Indiana State Telephone Association Convention, to be held on June 28 and 29, at the Hotel Lahr, Lafayette, Indiana. This company will have an interesting exhibition of its apparatus and will be pleased to have all visitors to the convention call and inspect same. It has just issued its Bulletin No. 11 on small exchange switchboards. This Bulletin gives some very good cuts of the small type of switchboard the company is making, both common battery and magneto systems. There are also several cuts of the different types of telephones for common battery and magneto work. This Bulletin will be sent to any one interested upon request.

THE F. BISSELL COMPANY, Toledo, Ohio, has added to its list of specialties, the novelty potheads, sleeves, terminal heads, etc., for telephone cable work formerly manufactured by the New Haven Novelty Machine Company, having purchased the patents, special machinery and good will of that company. In its circular, the Bissell Company advises that it will take some little time to get the business running smoothly, but it is putting considerable energy into it, and orders are being filled promptly. The manufacturers lay particular stress upon customers forwarding necessary information when giving specifications, such as, the number of pairs in the cables, as well as the outside diameter of the lead sheath. This is necessary, since cables vary in size of conductors from No. 19 to No. 22 gauge, and also in static capacity, and the lead sheathing also varies from 3-64 to 1-8 of an inch. All these items affect the external diameters of the sleeve and thus require different sizes of outlets, so that if a customer orders by pairs, it means nothing to the manufacturer, and consequently there is a loss of time in getting the order filled. These devices hereafter will be put under the name of "Security" to conform with the trade name of other specialties manufactured by the F. Bissell Company. Owing to their advantageous location and special new facilities, the manufacturers advise that they will be in a position to serve the trade with these popular devices much better than has heretofore been possible.

FOR SALE

Advertisements under this head, \$1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE—The Ottumwa Telephone Company's plant at Ottumwa, Iowa, including Franchise and all its property. The Company owns the three-story brick building, built two years ago, in which is installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing apparatus, all of the latest and the best. 1,250 telephones are installed, with 250 names on the waiting list. The Company also owns 80 miles of toll lines. This is one of the best telephone propositions in the State of Iowa. For full particulars, maps and photographs, address the Citizens' Savings & Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa. 187

FREE Sample to Agent. Practical ready call device for telephones. Saves brain work and hours of time. Sells itself. One sale sells dozens. Seeing is believing. Send stamp. The Telephone Appliance Co., One Madison Avenue, Dept. A. T. J., New York City. 193

FOR SALE—Switchboards and Telephones, all capacities and makes, Terminals, Cross-connecting Racks, Cable, &c., at less than half cost of new. Guaranteed reliable and efficient. Chicago Telephone Apparatus Exchange, 17 S. Elizabeth St., Chicago, Ill. 184

FOR SALE—60,000 1¼ x 8 locust pins, No. 2 quality, at price of \$3.50 per 1,000, in lots of 500 pins and up, f.o.b. cars North Wilkesboro, N. C. J. S. BOGGS, Albany, Georgia. 185

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

YOUR TOLL TICKETS!

HERE'S WHERE YOU GET THEM RIGHT!

12—GOOD FORMS TO CHOOSE FROM—12

FOR A DOLLAR BILL we will send you as a trial order, 1,500 of our No. 9 Tickets by return mail. All Tickets padded and transportation prepaid. 5M Large Size, \$2.50. 5M Small Size, \$2.25. Lots of 5M, 10M, 25M, or 50M. Write for our new catalogue, which gives samples and particulars. We also make Monthly Toll Bills, Trouble Tickets, and Artistic Office Stationery. Endorsed by AMERICAN TELEPHONE JOURNAL.

GILDART BROS., Albion, Mich. 168

SUCCESSFUL and experienced telephone man desires position as manager of Independent plant in the South or West. At present manager of 500-line common battery plant with extensive toll line connections, but desires to leave as his company has been duped into a Bell sub-license arrangement that is objectionable to him. Thirty years old; temperate. Best recommendations from present and former employers. Address, Box 191, AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York City. 191

POSITION WANTED as manager or superintendent of an Independent telephone company by man with four years' experience with Bell companies. Would lease an exchange or operate it for part of the profits. Best of references given. Address Box 197, AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York. 197

POSITION wanted by a practical telephone man as superintendent of a telephone system or as a salesman on the road. Experienced in all branches of operation. Address Box 195, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau St., N. Y. City. 195

POSITION wanted as superintendent or manager. Thoroughly experienced in magneto and common battery systems. Also with selective party line signaling. Have had charge of right-of-way department for the past two years in a district of five thousand subscribers. Experience gained with Bell company in the East. Address, Box 194, AMERICAN TELEPHONE JOURNAL, 116 Nassau Street, New York City. 194

WANTED—Second-hand Telephone Apparatus, Central Energy and Magneto Switchboards, Telephones, Bridging Bells, Transmitters, Terminals, Cross-connecting and Distributing Racks, Ringing Generators. State details, price, condition and make. C. E. W., 17 S. Elizabeth St., Chicago, Ill. 188

POSITION WANTED—An up-to-date telephone man, with best of reference as to ability and character, would like position in good Southwest town. At liberty August 1st. Address, P. O. Box 340, Cedar Rapids, Ia. 192

POSITION WANTED—With a company that is building or reconstructing its plant. Thorough, practical and theoretical knowledge of the construction of aerial lines in the most economical manner. Up-to-date knowledge of the telephone business. The applicant is a young man, energetic, and enthusiastic. Address, Box 108, AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 198

YOUR FIRST POLE ORDER

with us is the one that takes the time and trouble to get. In fact, it's the only reason we advertise.

Our exceptional organizations for handling Poles from the stump to your stations, guarantees that we get your succeeding orders.

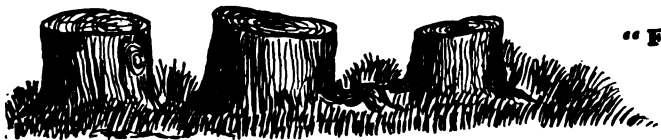
May we not hear from you regarding that "first order"?

MALTBY LUMBER COMPANY, 512 Phoenix Block, Bay City, Mich.

Pittsburgh Agents, TIPPER & PATTON, 513 Bessemer Building.

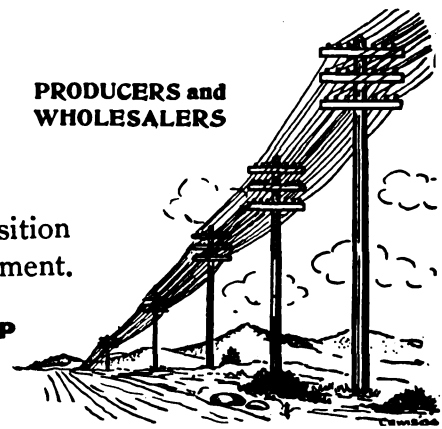
PITTSBURG & LAKE SUPERIOR IRON CO., ESCANABA, MICHIGAN.

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.



"From the Stump
to the Line."

PRODUCERS and
WHOLESALEERS



CEDAR POLES

From 16 Feet to 70 Feet

SPECIAL PRICES ON SMALL STOCK

C. H. WORCESTER COMPANY

Producers and Wholesalers of White Cedar Products

Suite 1206, Tribune Building,

CHICAGO, ILL.

Cedar Poles

Large Stock

Prompt Ship-
ment.



LONG
POLES
A
SPECIALTY

JOHN H. FOWLER,

General Office, 1705 Fisher Bldg., Chicago
Branch Offices: { Washburn, Wisconsin and
Milwaukee, Wisconsin.

FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

Digitized by Google

POLE STEPS

**PLAIN AND
GALVANIZED**



**9-16 X 9, 5-8 X 9, 5-8 X 10
INCH**

Other Sizes Made to Order

**We make our own steel and do our own galvanizing, therefore
lowest possible prices and quick shipment.**

INLAND STEEL COMPANY, CHICAGO

First National Bank Building

JUSTICE

**MAY
BE**



BLIND—

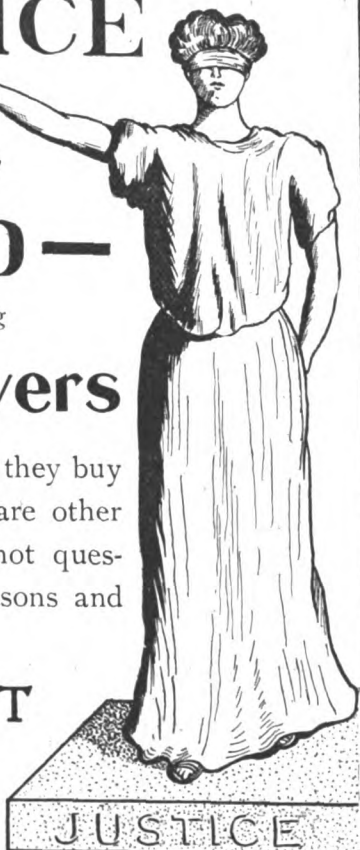
But Discerning

Pole Buyers

are not. That's why they buy
our poles. There are other
reasons, too. Why not ques-
tion us for other reasons and
prices?

**SAND POINT
CEDAR CO.**

Sand Point, Idaho



The **Valentine-Clark Co.**

*Beg to announce to
users of . . .*

CEDAR POLES

that they are now better equipped than ever before
for maintaining their prominent position among the
leaders in the cedar industry. Making a specialty
of Poles, they are identified with the leading pro-
ducing sections, concentrate their material at advan-
tageous shipping points and are in position for giv-
ing their customers the best of service.

Main Office . . .

**234 La Salle Street,
Chicago, Ill.**

Idaho Cedar Poles

PACIFIC COAST POLE CO.

SPOKANE, WASH.

**Index
of the
Technical
Press**

**INDEX
DE LA
PRESSE
TECHNIQUE**

**Index
der
Technischen
Presse**

INDEX OF THE TECHNICAL PRESS

An Index of the Principal
Articles published by the
Engineering Press of
the World

MONTHLY. \$2.50 YEARLY

Specimen on Application

Association de la Presse Technique

20, rue de la Chancellerie
BRUSSELS, BELGIUM

**Insulated
Electrical
Wires and Cables**

R DEBLINE

**Bare Steel and
Copper Tele-
phone Wire**

John A. Roebling's Sons Co.

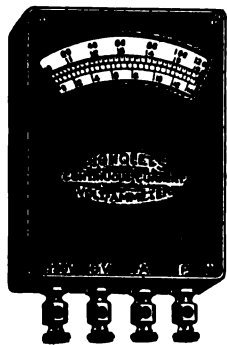
TRENTON, N. J.

**NEW YORK
SAN FRANCISCO**

**Agencies and Branches
CHICAGO
PHILADELPHIA**

**CLEVELAND
ATLANTA**

You Will Find It Pays To Test



your lines periodically for insulation and resistance. This can be best done with a Volt Ammeter. Mine are especially designed for this branch of telephone work and are low in price.

LOUIS M. PIGNOLET

Originator of the Voltmeter Habit.

78 CORTLANDT ST., NEW YORK

ADVERTISERS' DIRECTORY—Continued

CONNECTORS.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Nagel, W. G., Electric Co., Toledo, O.

CONSTRUCTION SUPPLIES.

American Electric Tel. Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Erner Hopkins Co., Columbus, O.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Hemingray Glass Co., Covington, Ky.
Inland Steel Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Lanz, M., & Sons, Pittsburg, Pa.
Nagel, W. G., Electric Co., Toledo, O.
Scovill Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

CONSTRUCTION TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Electric Appliance Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

COPPER.

Benedict & Burnham Brass & Copper Co., Chicago, Ill.
Scovill Mfg. Co., Chicago, Ill.

CORPORATION RECORD BOOKS.

Middleton & Co., J. W., Chicago, Ill.

CROSS ARM BRACES.

Inland Steel Co., Chicago, Ill.

CROSS ARMS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.

ENGINEERS AND CONTRACTORS.

Butterfield, J. F., Chicago, Ill.
Crumb, W. H., & Co., Chicago, Ill.
Imperial Finance & Construction Co., Chicago, Ill.
Keeling & Ridge Co., Pittsburg, Pa.
Stanton, L. W., Cleveland, O.

FUSES.

Cook, Frank B., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.

GERMAN SILVER.

Scovill Mfg. Co., Chicago, Ill.

GUY ANCHORS.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.

INSULATING MATERIAL.

Bissell Co., The F., Toledo, O.
Nagel, W. G., Electric Co., Toledo, O.
Okonite Co., New York.
Standard Underground Cable Co., Pittsburg, Pa.

INSULATORS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Hemingray Glass Co., Covington, Ky.
Nagel, W. G., Electric Co., Toledo, O.

LINEMEN'S TOOLS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Klein, Mathias & Sons, Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LIGHTNING ARRESTERS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.

LOCKERS.

Merritt & Co., Philadelphia, Pa.

MEASURING INSTRUMENTS.

Pignolet, L. M., New York.
Weston Electrical Instrument Co., Newark, N. J.

PATENT ATTORNEY.

Munk, Otto, New York City.

PINS AND BRACKETS.

American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Mfg. Co., Chattanooga, Tenn.

Columbia Mfg. Co., Antigo, Wis.
Cohn & Bock, Princess Anne, Md.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Nagel, W. G., Electric Co., Toledo, O.
Prosser & Son, L., Scottsburg, Ind.

POLES.

Beidler, Francis, & Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Bushnell, A., Kansas City, Mo.
Churchill, E., Heron, Mont.
Electric Railway Equipment Co., Cincinnati, O.
Fowler, John H., Chicago, Ill.
Lewis Lumber & Mfg. Co., Hattiesburg, Miss.
Maltby Lumber Co., Bay City, Mich.
Medora Milling Co., Medora, Ind.
Michigan Cedar Co., Bay City, Mich.
Mullen, Frank, Ewing, Ind.
Pacific Coast Pole Co., Spokane, Wash.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Sand Point Cedar Co., Sand Point, Idaho.
Sterling, W. C., & Son, Moaroe, Mich.
Valentine-Clark Co., Chicago, Ill.
Worcester, C. H., Co., Chicago, Ill.

POLE STEPS.

Inland Steel Co., Chicago, Ill.

PROTECTORS.

American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Hart & Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.

CONTINUED ON PAGE 37.



FARMERS' TELEPHONES

AND TELEPHONE SUPPLIES
LINEMEN TOOLS, BATTERIES, WIRE, BRACKETS, PINS,
CROSS-ARMS, BRACES, LAG BOLTS.

Quick Shipments.

Prices are Right.

HIGH GRADE TELEPHONES AND SWITCHBOARDS.

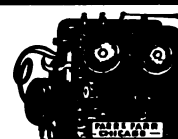
FARR TELEPHONE & CONST. SUPPLY CO., CHICAGO.



Exchange Telephones

and Private Line Telephones,
Express Switchboards, Gong
Switchboards, Large or Small
Transmitters, Receivers and
Hooks.

A set of Bookkeeping Blanks and Ledgers Free with a \$10.00 Order.



MARLIN CABLE HANGERS



NATIONAL
TELEPHONE
SUPPLY CO.
CLEVELAND

OWING to the limited number of
copies carried on file and the
large demands, back numbers of THE
AMERICAN TELEPHONE JOURNAL
will hereafter be sold for twenty-five
cents per copy.

THE AMERICAN TELEPHONE JOURNAL,

116 NASSAU ST.

CITY OF NEW YORK

"TELEPHONE TROUBLES AND HOW TO FIND THEM"

By W. H. HYDE and J. A. McMANMAN.

This Little Book is Strictly up-to-date on
all Matters Pertaining to Telephone Troubles
and their Remedies on both Magneto and Com-
mon Battery Systems.

WILL BE SENT POST PAID FOR

25 Cents

SEND IN YOUR ORDER.

AMERICAN TELEPHONE JOURNAL, 116 Nassau St., New York

Two Things Every Telephone Man Needs

They are the American Telephone Journal (pub-
lished weekly), a year's subscription for \$1.00, and
a copy of the new and revised edition of "The A. B. C.
of the Telephone"; a practical book for telephone men.

This new edition has been brought thoroughly up-to-date,
and sells for \$1.00. By a special arrangement we will send a
copy of the "A. B. C." and give a year's subscription to the
American Telephone Journal—both for \$1.50.

\$2.00 WORTH FOR \$1.50



NOTE.—This offer is not good on Renewals.

Name _____
Street Address _____
Town _____

State _____

American Telephone Journal
116 Nassau Street, New York City
Enclosed find \$1.50. Please send
me a copy of the Revised
"A. B. C." and a year's
subscription to the
Journal.

CYPRESS POLES CREOSOTED AND TREATED WITH CHLORIDE OF ZINC

If you want a telegraph pole *that will outlast any two cedar poles*, get the above. No decay. No dry rot. Nothing to give way. Test poles *sound after thirty years*. Price on long lengths same as cedar. Short lengths about one third higher. Address,

A. BUSHNELL,**903 BROADWAY,
KANSAS CITY, MO.****Pendleton & Gilkey****816 Lumber Exchange,
Minneapolis, Minn.****POLE PRODUCERS.**

We are producers and save you the jobbers' profit. That's why our prices are lowest. A trial order will convince you. Also that our *White Cedar Poles* are the finest in the land. Write for prices F. O. B. your town.

Cost of Construction Reduced

By Purchasing Chestnut Telephone

POLES and POSTSFrom **FRANK MULLEN**, Ewing, IND.*Reasons Why for the Asking***LARGE SIZES OF****CHESTNUT POLES, GUY STUBS,
CORNER POSTS and POLES**

For Special Use Carried in Full Stocks and Sold at Reasonable Prices

**THE MEDORA MILLING CO.,
MEDORA, INDIANA****MICHIGAN CEDAR CO., Ltd.****BAY CITY, MICH.****CEDAR POLES***We aim to please.**Try us with your Order.***Attractive Prices****Prompt Dispatch****Good Quality...****BRACKETS--X ARMS--PINS**

Little things it is true, but they cut a big figure in line construction.

OUR MOTTO IS:**Prompt Shipment—Quality Satisfaction—Right Price
COLUMBIA MFG. CO. ANTIGO, WIS.****E. OHUROHILL****HERON, MONT.****YARDS**

{ HERON, MONTANA
COEUR D'ALENE, IDAHO
CABINET, IDAHO
CLARK'S FORK

IDAHO RED CEDAR**POLES****25 to 80 ft. long.****W. C. STERLING & SON****MONROE, MICH.****Telephone Poles****Wholesale Producers 20 Years Eleven Pole Yards****We Rush Orders...****COHN & BOCK****YELLOW PINE CROSS ARMS****Oak Insulator Pins and Brackets****PRINCESS ANNE****MARYLAND**

We Make
a Specialty
of
Telephone
Poles.

Large Stock
16 to 25 ft.
4 to 6 in. Tops

For Rural
Lines

POLES**YARDS:**

Menominee, Mich.
Escanaba, " "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

**FRANCIS
BEIDLER
& CO.**
459-519 W. 22d St.
CHICAGO, ILL.

**J. W. Middleton & Co.**

**PUBLISHERS OF
THE INTER-STATE
CORPORATION RECORD**
Containing All Forms and Blanks
For Organizing a New Corporation
Stock Certificates, Bonds,
Corporate and Notarial Seals
Blank Books, Printing
Lithographing

167 Dearborn St.**CHICAGO.****Blank Books and Forms****FOR TELEPHONE EXCHANGE and
TOLL LINE ACCOUNTING.**

Toll Tickets Receipts for Toll Service
Toll Station Journals Receipts for Exchange
Toll Station Ledgers Service
Monthly Check Reports Lease Records
Cash Books, &c., &c.

Write for sample forms and prices.

**The Telephone Printing Company
DEFIANCE, OHIO**

Do you always mention the

American Telephone Journal

when writing to advertisers? It will be appreciated by all concerned if you do.

SPECIAL CROSS ARMS

ALL HEART, long leaf yellow pine, any size or length. Also **ALL HEART** cross ties, oak and locust pins and brackets. Write us for delivered prices. We can furnish 100 or 100,000 promptly.

LEWIS LUMBER & MFG. CO., Hattiesburg, Miss.

Please Mention the AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

We've wireless wires and
horseless cabs,
But will we ever own
A cussless, waitless, out-of-
order-less
Girless telephone?

—Life.

This Is It



See us at St. Louis,

Section 24,

Palace of Electricity.

Thousands have already
declared the Automatic
Telephone the
wonder of the
Fair.

**AUTOMATIC
ELECTRIC
COMPANY**
CHICAGO, U. S. A.

The Erner Hopkins Co. Wholesale
Electrical
Supplies

WRITE US FOR PRICES.

WE CAN SAVE YOU MONEY.

The ERNER HOPKINS CO., COLUMBUS, OHIO.

The James A. Spargo Wire Co.

Manufacturers of BARE and TINNED

COPPER WIRE

Fine Sizes a Specialty

JAMES A. SPARGO, Pres. and Gen'l Mgr.

ROME, N. Y.

Chicago Office: 1501 Menadreck Bldg.,
CHICAGO.

Keeling & Ridge Co.

General Contractors

Builders of Telephone and Tele-
graph Lines, Electric Railroad,
Power Lines, etc. Conduct Work
a Specialty.

Twenty-first and Sidney Streets,
PITTSBURGH, PA.

LE ROY W. STANTON
Consulting Telephone Engineer

Plans, Specifications and Supervision of
Installation of Complete Telephone Plants
Special Reports on Telephone Properties and Apparatus
411 Electrical Building, CLEVELAND, O.

BUTTERFIELD, J. F.

**ELECTRICAL ENGINEER
AND CONTRACTOR**

Complete Telephone Exchanges Built and Mate-
rial Furnished.
Cable Construction and Underground Conduct
Construction a Specialty.
Room 135, 113 Adams Street, CHICAGO, ILL.

THE IMPERIAL FINANCE & CONSTRUCTION CO.

CAPITAL, \$250,000.00.

Main Offices, 551-2-3 The Spitzer, **TOLEDO, OHIO.**

GENERAL CONTRACTORS

Telephone propositions financed, engineering estimates and reports promptly furnished.

WESTON STANDARD
PORTABLE
DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters
Millammeters, Ohmmeters, Portable Galvanometers,
Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE
STANDARD the world over. Our STATION VOLT-
METERS AND AMMETERS are unsurpassed in point
of extreme accuracy and lowest consumption of
energy.

Weston Electrical Instrument Co.,

Waverly Park, NEWARK, N. J.

BERLIN—European Weston Electrical Instrument
Co., Ritterstrasse, No. 88.

LONDON—Elliott Bros., Century Works, Lewisham.

PARIS, FRANCE—E. H. Cadiot, 12 Rue St. Georges.

New York Office, 74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.

Chicago Insulated Wire Co.

Bare and Insulated **ELECTRIC WIRES AND CABLES**
152-158 Lake St., Chicago, Ill. Factory, Sycamore, Ill.

PRICE LIST AND SAMPLES ON APPLICATION

**Linemen's Outfits
Construction Tools**

Write for our Catalogue and Net Price.

We make Linemen's Tools our
Specialty.

MATHIAS KLEIN & SONS
79 West Van Buren St., CHICAGO, ILL.



Telephone Wire

Every bundle of Wire bearing tin tags and lead seals as shown by these photographs is

Guaranteed the Best

and will invariably pass the specifications of the largest telegraph and telephone companies.

The National Wire Corporation

Works and General Offices: NEW HAVEN, Conn.

Sales Offices and Warehouses: New York, Chicago, Boston, Dekalb, Kansas City, New Haven, San Francisco

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.

**Burlington
Route**

P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

A Great Educator

It is conceded by all that The American Telephone Journal is the best paper published about Telephony. Write now for sample copy and ask for our combination offer on any telephone book you wish to buy.

The American Telephone Journal

116 Nassau Street,
New York City.

ELECTRIC RAILWAY EQUIPMENT CO.
MANUFACTURERS OF
IRON AND STEEL
TELEPHONE POLES.

CINCINNATI, OHIO,
U. S. A.
CABLE ADDRESS: "EQUIPMENT"
CINCINNATI, OHIO.
Prices on Application.

BITUMINIZED FIBRE CONDUIT

A conduit of endless durability. A continuous sealed insulating duct from manhole to manhole, impervious to gas and moisture and *Electrolysis Proof*.

A duct that is and remains *Perfectly Aligned*, into which and out of which cables can be drawn with ease and rapidity without the possibility of a scratch.

Saves sixty per cent of freight and handling costs, and twenty to thirty-five per cent of construction cost. All diameters one to ten inches, seven foot lengths.

Bends of All Angles

Prompt Deliveries

Send for Illustrated Booklet .

Ask for Prices, Giving Size and Quantities Required

AMERICAN CONDUIT COMPANY

856 Macy Street,
LOS ANGELES, CAL.

7th Floor, 170 Broadway, New York

Manhattan Building,
CHICAGO, ILL.

STANDARD Vitrified Conduit Co.

B. S. BARNARD, Manager.

39-41 Cortlandt Street,
NEW YORK.

Underground Clay Conduits.

High Grade Material.

Largest Factories in the World.



*Stock Always
on Hand.*

*Single or
Multiple Duct.*



**We are Supplying the Largest
Contract in the Trade.**

SEND FOR OUR CATALOGUE.

Dickey Conduits

**VITRIFIED CLAY
SALT GLAZED**

1-2-3-4-6-Duct.

Outside Steel Key Fastener (Patented)

Largest Manufacturers in the West.

Prompt Shipments.

W. S. Dickey Clay Mfg. Co.

NEW YORK LIFE BUILDING,

KANSAS CITY, MO.

W. H. Crumb & Company

**ENGINEERS
CONTRACTORS**

Telephone Engineering and Construction

Plans, Specifications and Estimates Promptly Furnished

Meritorious Independent Telephone Enterprises Financed

1263 Monadnock Bldg., CHICAGO, ILL.

McINTIRE'S

(Patent)

CONNECTORS

AND

TERMINALS

THE C. McINTIRE CO.

13-15 Franklin St., Newark, N. J.

Special
Connectors
for
Hard-Drawn
Copper
Wire

Fused Wire,
Fused Links
and
Strips.

COOK PROTECTORS

STANDARD

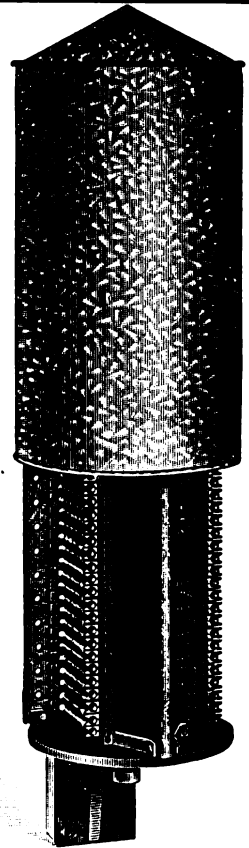


Type H. Cook tubular line fuse, combined with carbon plate lightning arrester, mounted on strips. Any number of pairs. Patented May 20, 1890; October 21, 1902.

All apparatus covered by
patents OWNED and CON-
TROLLED EXCLUSIVE-
LY BY MYSELF

FRANK B. COOK

240 - 244 W. LAKE ST. CHICAGO, ILL.



Type SS. — Cook Pole Cable Terminal, with line fuse and carbon plate arresters and metal cover. Pat. May 20, 1890; Oct. 21, 1902; other patents pending. All sizes, 5 pairs up.

ADVERTISERS' DIRECTORY—Concluded

Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

PAY STATIONS.
Nagel, W. G., Electric Co., Toledo, O.

RAILROADS.
Chicago, Burlington & Quincy Ry. Co.

SEALS.
Middleton & Co., J. W., Chicago, Ill.

STATIONERY.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

STOCK CERTIFICATES.
Middleton & Co., J. W., Chicago, Ill.

STORAGE BATTERIES.
National Battery Co., N. Y. City.

SWITCHBOARDS.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Century Telephone Const. Co., Buffalo, N. Y.
Conn. Tel. & Electric Co., Meriden, Conn.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Guarantee Teleph. & Equipment Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.

TELEPHONE BLANKS.
Telephone Printing Co., Defiance, Ohio.

TELEPHONE BOOTHS.
Yesbera Manufacturing Co., Toledo, Ohio.

TELEPHONE HOLDER.
Chicago Writing Machine Co., Chicago, Ill.

TELEPHONE SUPPLIES.
American Electric Tel. Co., Chicago, Ill.
Automatic Electric Co., Chicago, Ill.
Barr, W. J., Mfg. Co., Cleveland, Ohio.
Bissell Co., The F., Toledo, O.
Century Telephone Const. Co., Buffalo, N. Y.
Chicago Writing Machine Co., Chicago, Ill.
Connecticut Telephone & Electric Co., Meriden, Conn.
Couch, S. H., Co., Boston, Mass.
Eastern Tel. Mfg. Co., W. Chester, Pa.
Electric Appliance Co., Chicago, Ill.
Ericsson Telephone Co., N. Y.
Farr Tel. & Const. Supply Co., Chicago, Ill.
Guarantee Teleph. & Equipment Co., Chicago, Ill.
Hipwell Mfg. Co., Allegheny, Pa.
Holtzer-Cabot Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Monarch Tel. Mfg. Co., Chicago, Ill.
Mountain State Electric Co., Wheeling, W. Va.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.
Swedish-American Tel. Co., Chicago, Ill.
Vought-Berger Co., La Crosse, Wis.
Yesbera Mfg. Co., Toledo, O.

TERMINALS.
American Electric Tel. Co., Chicago, Ill.
Cook, Frank B., Chicago, Ill.
Kellogg Switchboard & Supply Co., Chicago, Ill.
McIntire Co., C., Newark, N. J.
Mountain State Electric Co., Wheeling, W. Va.
Nagel, W. G., Electric Co., Toledo, O.
Sterling Electric Co., Lafayette, Ind.

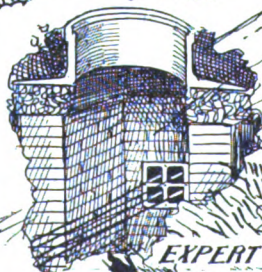
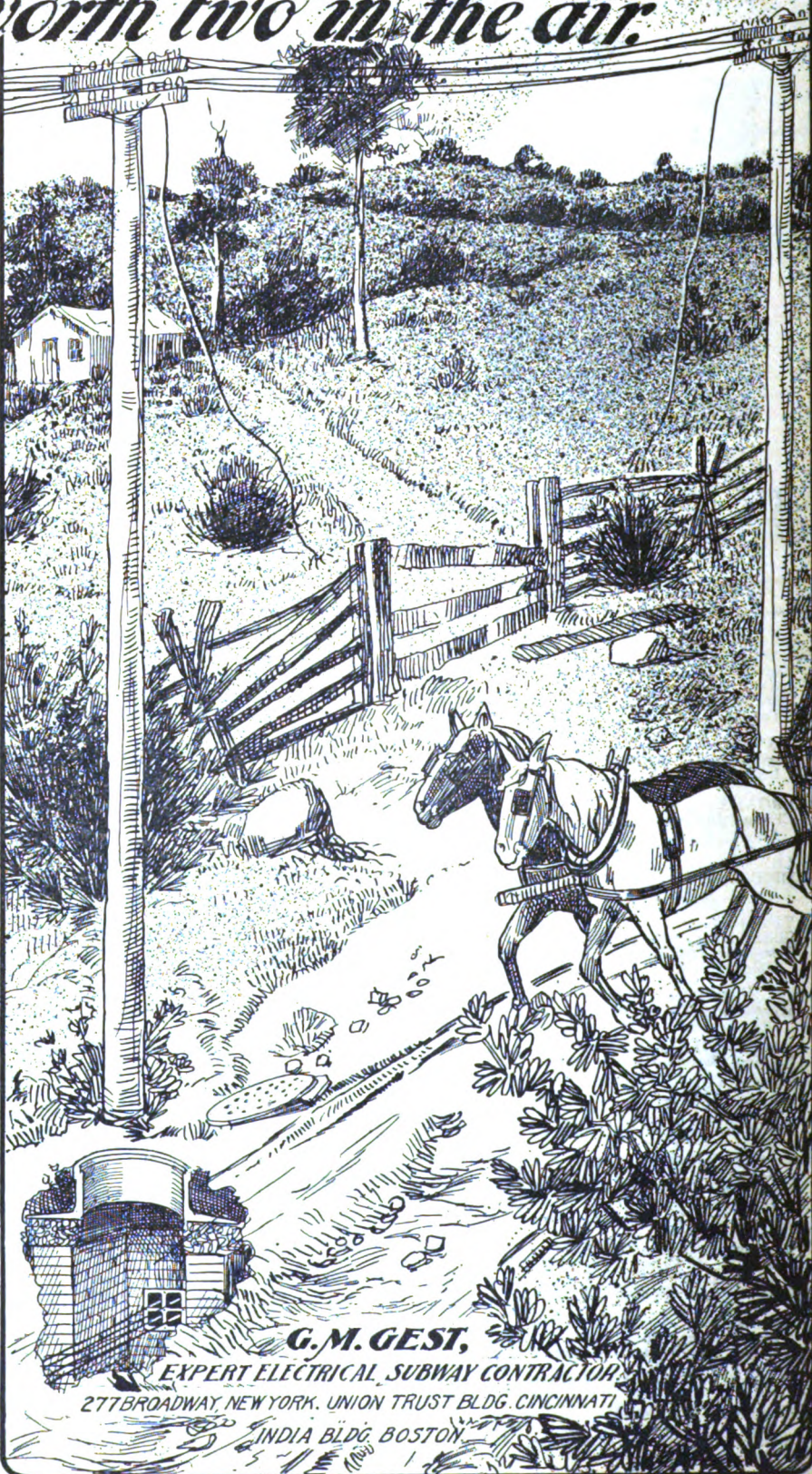
TOLL TICKETS.
Gildart Bros., Albion, Mich.
Telephone Printing Co., Defiance, Ohio.

TRANSMITTER ARMS.
Barr, W. J., Mfg. Co., Cleveland, Ohio.

WIRE.
American Electric Tel. Co., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Chicago Insulated Wire Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Nagel, W. G., Electric Co., Toledo, O.
National Wire Corporation, New Haven, Conn.
Okonite Co., New York.
Roebbling's Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Spargo, James A., Wire Co., Rome, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.

WOOD PRESERVER.
Bushnell, A., Kansas City, Mo.

*If a bird in the hand is worth two
in the bush. Then one
wire underground is
worth two in the air.*



G. M. GEST,
EXPERT ELECTRICAL SUBWAY CONTRACTOR
277 BROADWAY NEW YORK. UNION TRUST BLDG. CINCINNATI
INDIA BLDG. BOSTON

==USERS OF==
"CAMP DUCT"

***Always come back for more.
Pretty good sign, isn't it?***

The H. B. Camp Co.,

170 BROADWAY, NEW YORK.

Hartford Bldg., Chicago.

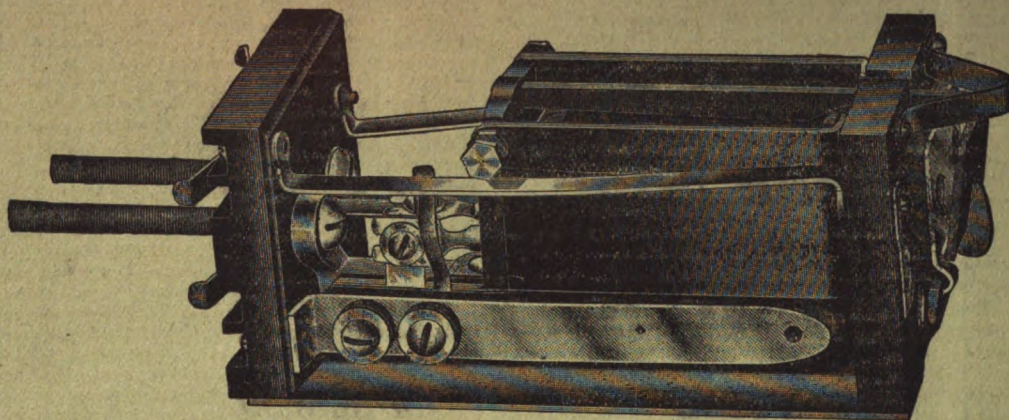
Ask the Keystone Telephone Company of Philadelphia how they like our conduit. They should know, as they have laid

6,000,000 FEET

AMERICAN VITRIFIED CONDUIT Co.

170 Broadway
NEW YORK

IMPROVED AMERICAN EXPRESS SWITCHBOARDS BETTER THAN EVER



Manufactured under
Patent Nos.

617,691
617,692
618,610
617,702
620,491
624,075
625,797
669,094
674,402
692,895
579,239

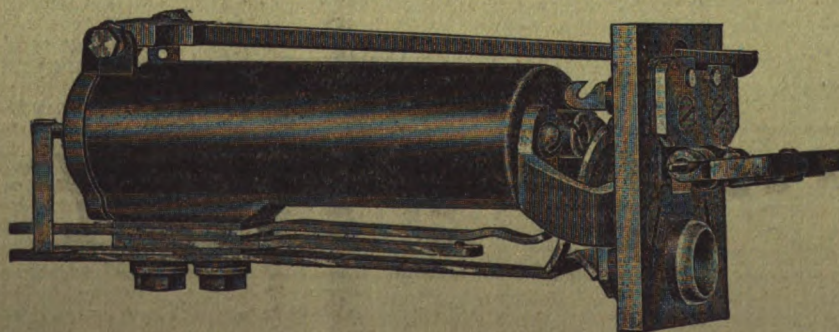
SELF-CONTAINED DROPS AND JACKS RAPID RINGING DEVICE

All drops restored to normal position by withdrawal of plugs.

SEE ALSO OUR

BELL-EXPRESS SWITCHBOARDS

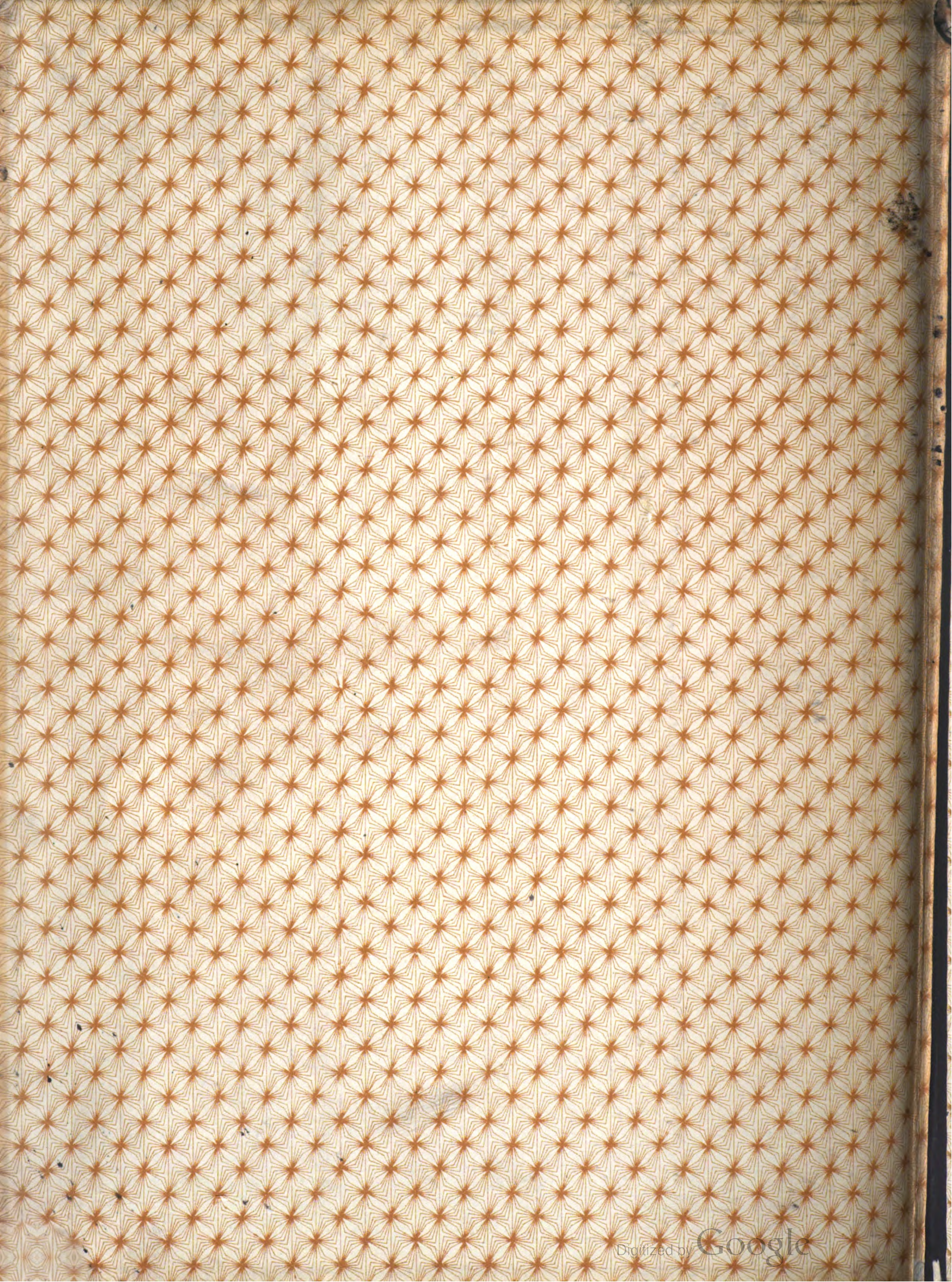
Which are built with self-restoring drops and jacks in banks of 5 and 10.



AT
POPULAR
PRICES

AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO



YF 00012

M89335

TIC1
A.67
09

THE UNIVERSITY OF CALIFORNIA LIBRARY

